Industrial Finishing

Reg. U. S. Pat. Off.

An Independent Publication Devoted to the Finishing of Industrial Products

Vol. VII, No. 3 **JANUARY, 1931** **$2.00 a Year**

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Published by PRACTICAL PUBLICATIONS, INC., 802 Wulsin Bldg., Indianapolis, Ind.

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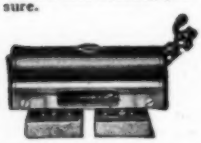

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LET FACTS AND FIGURES SHOW ADVANTAGES

From the Editor's Desk

THE persistent and prolonged overdoing of a thing invariably results in a disappointing reaction. History—political, economic and industrial—abounds in typical examples illustrating this fact. Fresh in our minds are the results of too many concerns continually cheapening and overproducing their products. Markets glutted with cheap goods produce a deadening rather than a stimulating effect on buying in dull times and in good times. The purchase of such goods does not impart that thrill of buying and that pride of ownership which are so essential in every retail transaction.

Cheap goods have been tolerated too long. It's time to devote industrial research, planning, investigating and labor toward manufacturing and developing uses for products more worth while, more enduring and more profitable, so that quality merchandise will dominate markets and satisfy ultimate consumers.

Instead of being ruled by the passion for volume and cheapness, let manufacturers strive to live up to this slogan: "Let's see how good we can make our products." This policy should prevail all along the line of manufacturing, so that finishing will not consist principally of covering up material and production defects. . . . will not be merely a temporary cloak to hide cheapness where there should be quality through and through.

A quality finish deserves to grace a quality product.

W. R. Rohr

Managing Editor

Every Man to His Trade
and
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How a Manufacturer of Lawn, Beach and Sun Parlor Furniture Maintains—

Color and Luster Uniformity in Lacquer and Enamels

By *CARL W. BOESE*

Assistant works manager of The Troy Sunshade Co., Troy, Ohio, explains what his company did to prevent variations in shades and luster when finishing articles made of wood and metal, using lacquers, baking enamels and air-drying wood enamels

"I trust this article will prove of interest. I feel that in this age of multi-color there must be other manufacturers who are experiencing some of the same difficulties with their finishing materials that we had before installing our present plan."—

Carl W. Boese

SEVERAL YEARS ago we found ourselves using lacquers, baking enamels and air-drying wood enamels of light and rather delicate tints. It so happened that these various kinds of paints sometimes appeared on the same article of manufacture. For instance, a couch hammock has a wooden back finished in air-drying enamel, while the metal arm rests are lacquered, and the framework is finished with baked enamel. The result was that we found variations in the shades [tints] and glosses from time to time, this making our product appear with little uniformity as to the shade of the paint work.

We had no standard from which to work, so that no one really knew just which of the paints were off-shade or how much so. We set about to correct this trouble, and now we have it controlled so that all our products appear uniform regardless of the type material used in the painting process. In addition, we know that our customers are receiving the same shades at all times so that an article sold at one season of the year will always match with that sold at a later time. Our course of action was as follows:

1. DECISION ON COLORS. The first step taken was to call a meeting of the sales manager, plant manager, finishing foreman and a representative of one of our paint supply manufacturers. From samples submitted they chose the ten colors which we adopted as "Standard," and which we were to maintain. These ten colors were to be matched in three kinds of finishing materials—lacquer, baking enamel, and air-drying wood enamel. In all we had 30 shades and glosses to maintain.

2. SOURCE OF SUPPLY. We had been purchasing our materials from several sources. This rose to some disagreement from time

to time. We were always trying to get one of our sources of supply to change our shade a little so as to match that which had been furnished by a different source. In addition, none of the sources saw our problem as a whole. We were not buying entirely on price because we felt it necessary to have quality material. Finally we decided to purchase our entire supply of paint materials from a single source and place the responsibility of shade maintenance squarely up to it.

3. Master Samples. The paint manufacturer of our choice was then instructed to supply us with a gallon sample of each kind of material in each color that we had decided upon. From each of these 30 samples a panel was finished according to our conditions of manufacture. These panels were carefully scrutinized and compared.

When we decided that the samples were correct we sealed away in a quart can a sample of this color and placed it in our stock room. The balance of the gallon sample was returned to the paint manufacturer with our okay. In this way our company and the paint manufacturer both had a master sample from which to test and compare, each taken from the same original can. Take note that we kept a wet sample rather than the finished panel which would fade or change in a comparatively short time.

4. Inspection of Shipments. It was suggested that the paint manufacturer include in each shipment a sample panel made from the shipment before packing, so that we could compare the shade with our master sample. We also decided to have our paint foreman make up a set of sample panels each month from the materials then in work and compare them with the master samples and with each other.

5. Employe Education. We conducted a campaign in our paint department in order to educate our employes in the proper methods of handling paint. We instructed them in the importance of always maintaining a uniform oven temperature for a given color, if it were to be baked. We instructed them in the importance of stirring the paint thoroughly before use, so as to apply material with uniform consistency. In short, we tried to have our employes see all of the factors of this color control with which they had a bearing and which they could assist.

6. Departmental Check. We gave to the heads of the packing and inspection departments a set of sample panels so they too could check occasionally the finish of the articles before finally going to our customers. This was a sort of extra check without the cost of a piece inspection. These panels also enabled our packing employes to familiarize themselves with the shades—reducing to a miniumum the chances of a misinterpretation of a color name. For instance, we use two greens designated by name and number, neither of which would identify the exact shade; but with the use of sample panels of these two greens with the numbers and names painted on them, identity became easy.

7. Cold Control. We realized that in order to maintain shades we would have to give our paint the attention it needed. Prior to this time we had kept our materials in a shed outside the plant. This resulted in cold, sticky,

seedy, enamels during the winter months. Accordingly, we constructed a brick shed outside the plant to take the place of this other wooden shed, and installed hot-water type heater in a little alcove constructed on the rear of the shed. This keeps our materials at a usable temperature, with the result that our straining problems are over. Nor do we over-thin our materials to bring them to working consistency, only to find that upon gaining room temperature they do not cover well.

8. Grease Elimination. We realized if we were to secure delicate shades [tints], as well as secure a durable finish, we must do everything we could to eliminate the presence of grease from metals before finishing. We used one of our baking ovens to burn off the grease present on certain articles. We sent some through a washer we already had, and some were washed with naphtha or lacquer thinner to remove this film. We also cautioned the heads of the machine departments to avoid using excessive amounts of oil on their tools, discs or forming fixtures, thus eliminating part of the grease trouble at its source.

9. Purchase of Materials. Recognizing the economy in purchasing materials in drums, nevertheless we found some other factors to be considered in the purchase of materials. First, it was difficult for us to be assured that the person securing paint from a drum would stir it sufficiently. Paint in drums, of course, settles out to some extent, the heavier pigments settling, the lighter ones tending to float. If not thoroughly stirred, one gets not only a material of improper consistency and formulation, but also a material of improper shade. In addition, the heavier pigments are drawn off first leaving in the remainder of the drum, liquids with little covering qualities.

Secondly, no matter how tightly we kept a drum sealed, the air inside caused it to "skin over." As this skin can not be removed from the ordinary type drum, it is necessary to stir this skin into the enamel each time the drum is tapped. The result is a very dirty condition of the paint, which necessitates considerable time to strain out—needless to mention the actual loss of enamel itself.

We figured it out something like this: We found in the bottom of each drum we opened about two to three gallons of skins and fatty materials which we could not use. This, say at $2.00 per gallon, represented a loss of $4.00, coupled with at least two hours time spent at intervals in straining the paint, which brought the loss up to $5.00. We found we could buy our materials in 5-gallon cans with wide mouths for an increase of ten cents a gallon. A drum lot would increase the cost to $5.00 more than we were paying, but would save us this loss. In addition, we were insured a perfect mix in this small can; we could remove any skin which formed from the top of the liquid and, since we were opening them at lesser intervals, we did not run the risks of a drum becoming "fatty" from long exposure. We feel that it pays us in dollars to buy in small containers.

I might also mention the ease of handling and inventorying these small containers. Then, too, we are experiencing good results with the outlined procedure. Each year we reestablish our master samples with our source of supply.

Finishing Wood Furniture

By
R. L. KNALL

Foreman finisher reveals some of the hidden causes behind many mysterious and baffling troubles that show up in finishes after the furniture has left the finishing department

THERE ARE a few fundamental rules that apply to all wood finishing irrespective of the species, whether foreign or domestic. If these rules are not followed, a satisfactory, durable finish is impossible, no matter how good the finishing materials may be or how skillfully they are applied.

First and foremost is the rule concerning the moisture content of the wood at the time the finish is applied. It is a well known fact that wood takes on and gives off moisture, due to variations in atmospheric conditions to which the wood is subjected. Wood may contract or expand repeatedly through these changes without any appreciable damage, until the finish has been applied. Then it is a different story—a real problem and a menace to satisfactory finishing results.

Most factories have their own drykilns in which lumber is dried and tested for moisture content before it is started through the regular process of manufacture. If no precautions are taken to maintain this specific moisture content by controlling the relative humidity of the air in the factory, the wood will quickly change in moisture content. The worst feature of a condition of this sort is that the actual moisture content of the wood is an unknown quantity when the work enters the finishing room.

Wood that is too dry is just as unsatisfactory to receive the finish as wood that contains too much

moisture. The air in factories where quality is a standard should be thermostatically controlled in all of its various departments, and a relative humidity of 28 to 33% should be maintained through the use of humidifiers.

Checking, cracking, pinholing and blistering of the finish are caused by the subsequent shrinkage or expansion of the wood as moisture is eliminated or absorbed. Often such defects do not show up until after the finishing department has spent too much time and material on the article. Sometimes months after the work has left the factory the finish fails for these same reasons. Many times the finishing room is blamed for these and similar defects, while their inception may have been in the early stages of manufacture.

Unprotected edges and backs may also be the source of a great deal of trouble. Moisture is absorbed more rapidly and in greater quantities through unprotected surfaces. This is especially noticeable where water rubbing is practiced.

Even greater care than outlined above should be taken in the treatment and handling of foreign cabinet woods. Slower and more uniform drying and extreme vigilance in maintaining the proper moisture content is required for successful results. I have observed that these woods are more susceptible to checking and cracking than our own domestic woods.

In order to produce a successful finish the surface should be clean and smooth. Shrunken cores, raised joints, open veneer joints, checked and blistered veneers are not produced in the finishing room. But these same defects will cause an uneven rubbed appearance, pull-outs and rubbed-through places which often require refinishing. This is far from being satisfactory, especially where oil has been used in the rubbing operation.

Regardless of how well the finishing room is organized, or what quality of finishing materials are used, or how carefully the schedule is followed, unless there is close cooperation between management and all of the other departments, a successful and a durable finish will be impossible.

Colors Popular for Automobiles

According to the December issue of the "Automobile Color Index," published monthly by The Duco Color Advisory Service, black continues at the head of the list of popular automobile colors for the fourth consecutive month. At the present time there are indications of a turning movement in the black trend preparatory to a decline.

Blue's relegation to fourth place among the hues displayed at the recent Chicago Automobile Salon is of small significance in view of the blue's established year round salability. Lombard, a new blue leader, darker than Andalusite blue and distinguished by a subtle grey undertone, has far outdistanced all other blues.

Green has surpassed brown in importance and is closely contesting blue for second place. This is the second month in succession that the largest individual color gain has been recorded by green. Not since January 1930, has interest in this hue been so active.

Brown has a sharp decline since last month. Interest in soft rich values similar to Cream Beige, Light Cracker Buff, Yedax Tan, and Stone Brown appears to be sustained, but the medium reddish hues of brown seem to be fast losing ground.

Maroon is rapidly regaining favor with interest centering in deep rich values, such as Crown, Baronial and Ascot. Grey continues the sharp decline entered into last month. Although deep neutral greys have returned to favor at the present time, there is a persistent minority interest manifested in greenish hues of grey.

The appearance of so many colors of low saturation on automobiles at the Chicago Salon may indicate the approach of a new color cycle which would impair the monopoly so long enjoyed by dark, subdued shades.

Preparing frames and putting on the silk for high-class dependable—

Silk Screen Stencils

By
HARRY L. HILL

Designing and constructing wood frames for silk screens, squaring and truing the frame, selecting, stretching and attaching the silk, shrinking the silk afterward and conditioning the equipment for service

THE STENCIL is the foundation of all silk-screen process work. Nearly every process printer has his own particular method of making frames and stretching silk. I have experimented with several different methods of doing this work and believe the following method the most successful.

Before taking up the question of frame construction, I want to call attention to the lumber from which frames are made. We always have on hand a six week's supply of select white pine free from knots. This material is carefully placed on cross sticks and weighted down so that it will remain straight. The lumber is kiln dried when purchased, and during the six weeks on sticks in our plant it tempers or seasons to conditions under which it will ultimately be used. All of this care and preparation has proved fully worth while.

Constructing the Frame

Medium and small size frames are made from strips 1⅝-in. thick by 1¾-in. wide, with mitered corners. Large size frames, such as are used for large metal signs, are made from material 1¾-in. thick by 4-in. wide. We are very careful that all frames are built square and that they are perfectly flat when completed. A frame must have perfect contact on all sides and corners when hooked up on the screening table or unit base, to insure desired results. The framing table or unit base must be perfectly flat and level as well as the frame.

Good process work is an easy matter when the frame and table are constructed correctly. On the other hand, good results are almost impossible with weak, wobbly equipment. Considerable loss of time, material and tearing of expensive silk will be experienced unless all of the equipment is carefully constructed.

After the frame is built, but before the silk is stretched, two moderately thin coats of orange shellac should be applied on all four sides of the strips in the frame. This prevents absorption of moisture by the lumber, which would cause the frame to warp and twist. Two thin coats of shellac will penetrate the wood and they are superior to one heavy coat which surface-dries quickly and has a tendency to chip off when handled.

Stretching the Silk

We use 13XX bolting silk; this we stretch and tack to the frame

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with flat cut staples. These staples are driven with an automatic self-feed tacker. All staples are driven through a ½-in. twilled tape binding to prevent the staples from cutting the silk when they are driven down tight. This tape also acts as a cushion grip, making it possible to draw the silk more taut without tearing the fabric. Another advantage of using this tape is that it prevents the silk from tearing at the staples during the shrinking process.

Start stretching at any corner of the frame by driving two staples through the tape and silk. Draw the silk as tightly as possible lengthwise of the frame and tack at the corner. Then draw the

Fig. 1—The silk and tape drawn tightly and fastened at each end of one edge of the frame.

tape as tightly as possible over the silk and tack tape at the other corner as shown in Fig. 1. Staples should be driven ⅜ to ½-in. apart through the tape and silk. Next draw the silk and tape along the short end of the frame and tack. The silk is now fastened onto the frame in the shape of the letter L.

Repeat the drawing and tacking operation along the other long edge of the frame—with this exception: on this edge, the silk should be drawn and tacked at the same time until the corner is reached. Now the silk is fastened in the form of the letter U. In tacking the last edge, draw the silk so that the mesh will be square in form, as shown in Fig. 2—not diamond shape or distorted.

After stretching, apply a coat of

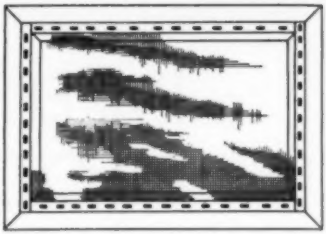

Fig. 2—Completed screen, silk side up, showing twilled tape and flat-cut staples.

shellac to the taped edges of the frame, saturating the tape thoroughly as this also aids in holding the silk firm and prevents tearing at the staples when the fabric is shrunk.

Shrinking Silk

After the shellac has thoroughly dried, proceed to shrink the silk by saturating it with water as hot as the hand will bear. We always put a little glue in this hot water—about a tablespoon to the pint of water. Immediately after saturating the silk with hot water, wipe both sides of the silk with a sponge dipped in cold water. The hot and cold applications cause the fabric to shrink.

Very little glue will remain in the silk after sponging, but enough will be present to aid materially in cleaning the stencil after the first few runs. Glue-sizing also tends to bind any lint present in the silk and produces a smooth surface which releases paste paint easily back of the squeegee when the stencil is new.

Large Frames

When stretching silk on a very large frame such as used in producing wallpaper or outdoor metal signs, I have found it advantageous to spring the two long sides of the frame in toward the center

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before applying the silk. This may be done by inserting two screws opposite each other in the center of the long edge of the frame and using a flexible wire to draw and bind the sides of the frame to a slightly concave position as shown in Fig. 3. Naturally, the screws and wire are placed on the side of

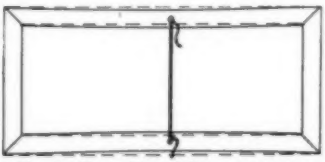

Fig. 3—How sides of frame are sprung in and held temporarily while silk is applied—this being done to tighten the silk along the mid-length of the frame after it has been applied.

the frame opposite to the silk. After the silk is stretched and tacked, release the wire and proceed with shellacing and shrinking as described above. In contracting the sides of a long frame, even tension is insured.

Truing Frame

Even with all the care exercised to secure a perfectly flat or level frame, there are times when the frame will need truing after the silk is stretched. Another advantage in using 1⅝-in. lumber in frames is that this thickness aids in the truing operation and produces the strength and rigidity which are so necessary for perfect registration in multi-color work.

To true the frame, place it on a perfectly flat surface with the silk side down. Tap all sides and corners lightly. If it does not lie perfectly flat, it is generally the opposite diagonal corners that do not touch the flat surface. The thing to do is to force the raised corners down with weights, thereby causing the other two mitered joints to open slightly. Place a very thin maple wedge in each of the opened joints, remove the weights from the frame, and tap the wedges until the raised corners touch the flat surfaces. When this is accomplished and the frame is perfectly true, break off the wedges flush with the surface of the frame. If this work is done correctly the frame will remain square and true.

Care should be used in making the maple wedges, for if the taper of the wedge does not conform to the opening in the joint, when it is driven in, it will spread the joint from top to bottom or split the joint open instead of correcting the faulty condition. If this is done not only will the frame be ruined but the silk also will be torn. The wedge should be as wide as the length of the joint in which it is to be used.

Meetings Scheduled Next Month

The Annual Convention of the National Association of Paint Distributors will be held February 23-25, with headquarters at Hotel Drake, Chicago; E. R. Drake, 927 Blackhawk St., Chicago, secretary.

The Annual Convention of the International Association of Master Painters and Decorators will be held February 10-13, with headquarters at Hotel Peabody, Memphis, Tenn.; E. J. Bush, Peoria, Ill., secretary.

DeVilbiss Foreign Representative Returns from Trip

Jose Vallet, special foreign representative of The DeVilbiss Co., Toledo, Ohio, has just returned after a year and a half tour of the industrial centers in South America and the Orient. Mr. Vallet visited DeVilbiss distributors, trained their salesmen, and established some new agencies. In talking with dealers who sell DeVilbiss atomizers and perfume sprayers, Mr. Vallet was impressed with their liking for manufactured articles made in the U. S. as being dependable products of high quality.

MISSING PAGES REMOVED

Refinishing Fokker Aircraft

By
G. L. HARDY

Second article in a series describing the material and routine specifications included in cleaning, conditioning and finishing the metal, plywood and fabric surfaces of modern aircraft in service for Western Air Express and subsidiaries

FOR THE FLOOR of the cabin and vestibule, I suggest using a dark shade of brushing floor lacquer that will tend to absorb the light rather than reflect up into the occupants' eyes. This should be applied well toward the last of the program, and paper should be put on the floor until after the test hop, and left until the ship is ready for her run. Floor lacquer is preferable since it dries quickly, and it is quite durable and easy to apply. Cabin heaters should be finished in baked enamel to withstand the scuffing and kicking.

If the welders, riggers, and woodworkers are out of the way, and the fuselage has been checked, the prime coat may be applied. With a large crew, this may be brought along at the same time that the cowling is being prepared and finished.

Careful attention must be observed in the selection of the primer, especially if the ship is being rushed through. If such is the case, it will be wise to select a four-hour, non-bleeding, dope-resisting primer, as this will eliminate the use of dope-resisting paint.

If the rush is not too great, one of the long-oil primers will be advisable, but care should be exercised in applying the coat uniformly so that it will not puddle up where spray strokes overlap from one panel or bay into the other, as these puddled spots will wrinkle or lift under the lacquer finish coat. This is possible also of the short-oil primers, not properly dried.

A gun that has a cone spray attachment is the ideal one to use in spraying the fuselage. In this operation, whether it is "spotting in," or a complete job, it is advisable to start on the top side

and outside face of the top longeron, spraying either from nose to tail or vice versa.

After spraying the top side of the upper longerons, step into the foremost bay, entering from the bottom, and spray the underside and face of all overhead, diagonal and vertical braces and brace wires on all four sides, leaving from the bottom of the bay and not from the side.

Next, the outside of the bays should be primed in the same manner; and as the last part of the operation, the bottom side of the lower longerons and cross braces should be finished off.

The tail surface assemblies are finished in much the same manner as the fuselage. Sandblast and bake the primer on the stabilizers and fin if possible, and use a long-oil primer on all baked work. Follow the same procedure as priming when applying the fuselage color. Likewise, in the application of the dope-resisting paint, whether brushed or sprayed. If a dope-resisting primer has been used, the dope-resisting paint is not necessary, but be sure to use a primer that is non-bleeding.

Fabric Finishing

Apply the dope-resisting paint as soon as possible to avoid delay in stretching on the cover. It is advisable to avoid rushing the covering too soon over the paint, as stretching on the cover too quickly might cause considerable damage to the soft surface.

Allow at least four to six hours drying according to weather conditions and according to whether a blanket or envelope type cover is used. Be sure that the covering has been drawn to uniform tightness, and that nothing is left for chance shrinkage of excessive applications of dope. Then apply the dope as soon as possible, so as to minimize the loss of the original tautness. This is especially applicable in winter or in humid weather. Put the covers in the sun or in a heated room if possible before stretching them over the ship.

The first three or four coats must be applied reasonably thin so as to insure thorough impregnation of the dope through the fabric. Brush the material on wet, using a thick No. 45 stock wall brush and flow out well. Keep the dope uniformly mixed at all times. The foreman must see that this is done—that one man doesn't have a bucket of old thick dope while another man has a bucket of thin fresh material. Mix at least five gallons at a time, and have every man use from one uniform mixture. After the dope has set out in small open containers, pour back and thin out again as needed.

Scuff off after the third coat, and sand thoroughly after all following coats, using Nos. 150 or 180 dry sandpaper.

Speed is gained by applying four or five coats more than ordinary and using the mixture a little thinner than usual all the way through. This method requires less sanding and less material, and the final finish is far better from a point of thorough impregnation, durability to the extreme, and better shop routine, plus lower finishing costs.

If the spray is used after the third or fourth brush coat, whether it is a syphon-feed cup or pressure pot, do not see how heavy the dope can be used, but use discretion and thin it enough so that all coats are applied without streaking. Sand lightly after each coat.

Cheap or inexperienced help should have no place in a finish-

"Take Your Choice between Water Stain and Permanent Stain"

. . . . said this nationally known manufacturer to his cabinet makers

They all chose:

Murphy *Permanent* Stain

BY letting out his enormous contracts for cabinets in strategically located points in 13 different states, one of the best known national advertisers solved an important shipping problem. *But,* his specifications and inspections were rigorous. High quality *must* be achieved and uniformity *must* be maintained.

After investigating Permanent Stain for over a year, this manufacturer specified to his cabinet makers, "either Water or Permanent Stain—optional." He left it to their judgment how best to meet the inspections that are rigidly made. Everyone of them chose Murphy Permanent Stain and is *now using it.*

That is just about a 100% testimonial to the practical merit of this superior product. Aside from the economy of Murphy Permanent Stains, consider carefully these important performance facts:

Murphy Permanent Stain is as fast to light as your present water stain —exactly the same colors are used.

Murphy Permanent Stain does not raise the grain of the wood, because it penetrates instantly; *but* a secondary action occurs almost immediately which returns a finely dispersed "wet stain film" to the surface of the wood. This film is "soaked up" by the wood fibres, just as Water Stain is—thus approximating the distinctive uniformity of Water Stain, without the necessity of over-saturating, and hence distorting the wood fibres.

Ideal for spray-gun application—in your production figuring you can depend absolutely upon immediate movement of your stained work and upon positive short-time "filling" over it (some allow but half an hour).

Murphy Permanent Stain permits immediate "automatic blending" and "high-lighting" of stained work as a continuous operation in the spray booth. It also accomplishes instant "matching-in" of wood variables.

Go over these points again, with your own specific work in mind, consider how well Murphy Permanent Stain will fit into your production. And recall the verdict of the many cabinet makers who deliberately and unanimously made their choice.

If you want either a demonstration or further information on Murphy Permanent Stain please write us.

MURPHY VARNISH COMPANY

Newark Chicago San Francisco

Essex Varnish Company, Newark

(Associate Company) *Baking Material Specialists*

ing room—not on maintenance, custom or production work.

Aluminum Pigmented Dope

For better filling and shielding from the destructive rays of the sun, use aluminum pigmented dope. About 1¾-lbs. of bronze powder to five gallons of dope, according to the mesh (fineness) of powder used. Batter the pigment up in a small quantity of thinner before mixing into the dope.

Have the tail of the ship lifted up on a trestle into flying position. This will give better access to the under parts and will make the applications on the top of the wing much easier to handle.

This mixture sands and fills well and protects the dope considerably against the ultra violet and actinic rays of the sun. To use much more bronze powder in the dope would result in a chalky finish that gives poor adhesion and bond to the finish coats of lacquer, and considerable grief may be experienced immediately in peeling off when the masking tapes are removed, and later from peeling or flaking off of the fabric.

Should the tail surfaces, be a refinish job and excessively coated with lacquer, give them a hard sanding down almost to the clear dope finish. Should the fabric be too loose, re-dope with at least three coats, and finish off with three coats of aluminum lacquer. The mesh of the bronze will determine the amount that has to be used in the lacquer. There should be a fair amount of bronze powder even in the finish coat for the protective purpose that it gives from the sun's rays, as well as keeping the finish from assuming a yellowish cast, which all straight clear finishes assume in a very short period. You may still retain a beautiful gloss and the finish gives much more of a burnished metal effect than the straight clear lacquer coats. About 3-oz. of 150 to 175 mesh bronze to the gallon of the finish is a very good base to work from.

Bronze Powder

It is very hard to give exacting figures to the ounce of bronze powder per gallon of lacquer, as so much depends on the type of vehicle and the quality of bronze powder used. So many bronze powders that are "bought for price" contain various inerts, such as talc lead, etc., that to state the exact specifications of Western Air Express, would be folly to have you adopt if your material varied very much from the imported fine brilliant aluminum lining bronze powder, that we use.

To use a coarse powder and depend upon the excessive application of clear finishing lacquer and mist coats to float the bronze up into these applications, is too risky for a large surface. Also, it means added coats of materials and more labor as well as excessive weight and skin friction, which everyone in aviation is doing his utmost to pull away from.

Quite frequently the tail surfaces call for a second or third finishing before the main body of the ship is ready for a second finish. Here a heavily-lacquer-loaded surface would be almost impossible to bring to full tautness without expensive sanding or stripping operations. The entering edges are subjected to a sand-blasting of dirt particles carried back with the prop wash and therefore they should be extra heavy coated. It will possibly be wise to bear this point in mind relative to the finishing of all leading edges.

Your SATISFACTION *determines our success*

You buy our finishing materials in the hope that the finishes they produce will enhance the appearance of your products—cause those products to compel prospects' attention, hence sell more swiftly. That hope must be fulfilled, if you are to remain a customer of ours. That's why we insist on making finishing materials of the finest quality, only—finishing materials that breed complete SATISFACTION among our customers.

If, for 1931, you are bent on improving your products or making new ones, be sure to avail yourself of our free studio service. Our experts will be glad to work with you on the creation of new finishes that are bound to result in SATISFACTION, both to you and to your customers.

The
ROCKFORD VARNISH
Company
ROCKFORD, ILL.

More About Sanding

In sanding the tail surfaces, do not rest the weight of the idle hand between the ribs, but on the ribs themselves.

Sanding between coats will give you a positive idea as to how the fabric is filling. Do not save all the sanding until after the last coat of dope is applied. Doing it in the last mentioned way is never positive unless every man is a thoroughly experienced mechanic, and at that it is the slower and more costly way.

Let the doped surfaces come to full tautness before applying the lacquer color finish coats.

If the space between the outside of the fish nose stripe is a different color from the body of the fuselage, spray this first, as it will be easier to cover this space than it will be to cover back on the fuselage. Silver is the best harmonizing color to use in this space as it offers a pleasing effect to go with the clear metal cowling.

(To be continued)

Refinishing Automobiles

The first operation in refinishing automobiles, is to gas sand (use gasoline as a lubricant in wet sanding) the entire surface, giving special attention to any rust spots. Gas sanding is an important operation. It should be done with ordinary gasoline (not ethyl gas) and No. 220 sandpaper. Large rust spots should be washed with alcohol after sanding.

When the entire body is thoroughly cleaned, it will be found that the sandpaper—even though it has been lubricated with gasoline in the sanding operation—has left fine scratches in the lacquered surface. If primer and finishing coats are applied over this finely scratched surface, the imperfections will be magnified.

To eliminate these defects, the application of a mist coat of lacquer reducer is recommended, as this will "flow out" these scratches and provide an excellent surface for the flexible oxide primer (cellulose base). After the primer has thoroughly dried, the surface should be lightly sanded with No. 240 sandpaper.

Cleaning the surface is the next operation, followed by a double spray coat of colored lacquer. By spraying double, it is understood that the operator sprays first horizontally, then vertically. When dry, the body may be polished.

If care is taken in the preparation, cleaning, and finishing operations, this schedule will produce an excellent refinish job.—M. V. L.

Cellulose Acetate Molding Materials

The Lumarith Division of Celluloid Corp., 10 E. 40th St., New York City, has ready for free distribution "the first authoritative treatise dealing with the chemical and physical properties as well as molding procedure and applications of the new plastic molding material—cellulose acetate."

Grand Rapids Varnish Appoints District Sales Managers

The Grand Rapids Varnish Corp., 565 Godfrey Ave., S.W., Grand Rapids, Mich., announces the appointment of Roy E. Cook as eastern district sales manager. Mr. Cook will cover the New England states, New York, Pennsylvania, Maryland and New Jersey, making his headquarters at York, Pa.

Everett C. Bryant has been appointed as southern district sales manager, covering Virginia, North and South Carolina, Georgia, Tennessee, Mississippi, Texas, Arkansas and Louisiana; headquarters at High Point, N. C.

Todd Cunningham has been employed as a salesman to cover Mr. Bryant's former territory, including Western Tennessee, Arkansas, Texas, Louisiana and Mississippi; headquarters at Fort Smith, Ark

The DICTIONARY says→ Lingerwett

CHAMPION:
Acknowledged superior to all competitors: holding the first prize or claiming first excellence

is the *CHAMPION* remover

outsells all other removers

There are hundreds of removers in the market—but, as in everything else, there is one that stands in a class by itself. Like every champion, it has earned its title, earned it by outselling every other remover in America.

Just a few highlights of Lingerwett will give you the basis of this superiority, proved through countless tests and active performance on the job:

It takes only a short time for Lingerwett to do its work.

Lingerwett penetrates with arrow speed, through many coats of paint, lacquer or varnish. Ten coats, fifteen . . . or more.

Going over the same surface several times is rarely required with Lingerwett. This remover usually cleans surfaces perfectly with *one application*. It stays wet longer, even overnight, due to the protective layer of air-tight film.

The troublesome sticky messes you get with most cleaners cause lots of extra handling and delay. Lingerwett develops a loose sludge which is easily wiped off.

There is the story. An important one for you; it means time saved, and a better grade of work because you have cleaner surfaces to work on.

Lingerwett is the kind of remover you have always wanted, and unless you are using it now, have never been able to find.

You can get Lingerwett from your regular source of supply. Or send the coupon for our trial offer.

The Wilson-Imperial Company
Newark, N. J.

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Please send me a free trial can of Lingerwett.
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Jazz Finish Produced by Floated Colors

By
WM. WRIGHT

Color chemist explains clearly and in considerable detail how to produce a multi-color "jazz finish" of irregular design by dippng the parts to be painted into colors floated on water

TO PRODUCE an attractive and satisfactory effect in a "jazz finish" everything depends upon the shade desired. The colors I used were yellow, orange, light blue, red, black, and jade green. All colors employed were of the quick-drying enamel type; namely, four-hour enamels taken from stock.

Colors Floated on Water

The following method was employed in producing the multi-colored effect. I used a water bath which had a surface area of about ½-sq. ft. and sufficient depth so that the longest article could be dipped vertically without disturbing the container. Then I allowed two drops of the following colors: black, yellow, jade green, and orange, to be put carefully on the surface. Extraordinary precautions were taken to avoid splashing or cause bubbling on the surface of the bath, as these two encumbrances will spoil the desired effect.

A good way to avoid splashing or bubbling is to take a palate knife and dip it into the color; then convey the color to the water bath by allowing the enamel to drop from a height of ½-in. from the palate knife to the bath. Then dry the knife and cut the colored drops in half, using a zig-zag motion. Continue this procedure until the surface of water bath is fully covered. Care should be taken to avoid using the knife flatwise to spread the drops.

Dipping the Article

After the colors are spread on the surface, allow them to remain intact for about three to five minutes. Then take article to be dipped and insert it slowly. The colors will adhere to the article. Remove article slowly, care being taken to shake off small globules of water adhering to article. The colored material is then put on a rack and dried in an oven at a temperature of about 160° F.

Flat White Undercoat

Regarding the surface of the article to be colored, I would suggest that it first be sprayed with a flat white lacquer, thus giving a suitable background and surface for the colors to adhere to. I have tried various surfaces and colors and have come to the conclusion that smooth surfaced articles cause the colors to "bleed"; they run into one another and have no decided border line. Care should also be taken so that the enamels on the surface of the water bath are not too thick, as this also will cause "bleeding."

The most useful SERVICE *in the realm of* Finishing

ANALYSIS AND SKILLED ADVICE

In 16 strategic centers, handy to you, are practical men who know how to size up your particular problems — and *solve* them. They realize that real *satisfaction* is the only basis of continued business, and they don't just *sell* you something — they get to the root of the problem and either find the answer or tell you frankly it can't be done.

MOST COMPLETE LINE

In the present Egyptian line are finishes for almost every conceivable type of surface, for almost every kind of service-condition, for almost every color-effect desired. Our service men have this extraordinary range immediately available for you.

SPECIAL CREATIVE LABORATORY

The research work done by Egyptian is not only developing *new* materials all the time, but can be used to solve *your* particular problem. We will build a lacquer for *you* — show you how to apply it most economically — show you how to reduce all your finishing costs — show you how your new finish can be sold more effectively.

• • • We cordially invite you to use this remarkable service — to improve your finishing, reduce your costs, stimulate your sales.

EGYPTIAN Lacquers

THE EGYPTIAN LACQUER MFG. CO.
90 WEST ST., NEW YORK CITY
Branches in charge of practical men *maintained in*
ATLANTA ✓ BOSTON ✓ BUFFALO ✓ CHICAGO ✓ CINCINNATI
CLEVELAND ✓ DALLAS ✓ DETROIT ✓ KANSAS CITY
LOS ANGELES ✓ PHILADELPHIA ✓ PORTLAND, ORE.
SAN FRANCISCO ✓ SEATTLE ✓ SPOKANE ✓ ST. LOUIS

The Maker Who is Proud of What He Makes Uses Egyptian Lacquer

Important Precautions

If extreme care is given to the following factors, little trouble should be encountered in producing desired effects. Area of bath, amount of color used to area of surface of water bath, time allowed before dipping, use of palate knife to cut and disperse the colors, surface of the article to be dipped, and background and undercoat of article . . . all vital factors in the production of the "jazz effect" finish.

Also remember that when the first drop is added to the surface of the water, it will be noticed that it spreads all over the water bath, but upon the addition of the second drop it will be noticed that the dispersive quality of the enamel has been minimized so that one can proceed with the cutting and zig-zag motion. Also remember that varied patterns can be obtained by twisting and turning the article when dipping.

Asbestos Paint

For use as a paint the asbestos must be ground as fine as possible and then thoroughly screened. The best vehicle is waterglass because it is of inorganic nature and very resistant to heat. It is, as always, used diluted; for each gallon of waterglass (so-called painter's waterglass) 2½ to 3 gallons of soft water are used; the asbestos is stirred up with this solution and then diluted to the proper consistency for brushing. The thicker the coat is applied, the greater the protective effect; two coats are always to be recommended.

In the case of unfinished (rough) wood, care should be taken that all of the surface of the wood will be coated so that a coherent surface layer will be formed. If the paint is to have any color except natural asbestos color (chiefly gray to greenish or yellowish gray), white or colored pigments can be added in quantities up to 25% of that of the asbestos powder, but these pigments must be fast to alkali, as otherwise they will be affected by the waterglass. Finely-ground heavy spar can be used for white, ocher and umber for yellow and brown, English red (free from gypsum) for red, the ultramarine colors for blue and green, and Frankfort black for gray.—Translated from German.

Spruance Completes Addition to Plant

The Gilbert Spruance Co., Philadelphia, Pa., "manufacturers of paints and finishing products for practically every known purpose" announces the recent completion of an addition to its already extensive plant at Richmond & Tioga Sts., in the Frankford section of Philadelphia. This new fireproof building is equipped with up-to-date devices and improved machinery and will be devoted exclusively to the manufacture of lacquers and lacquer enamels.

"Principles of Mill and Paint Shop Practice"

The Bruce Publishing Co., 354 Milwaukee St., Milwaukee, Wisc., announces the publication of "Principles of Mill and Paint Shop Practice," by Ralph G. Waring, research chemist and specification engineer, Tuscarora Laboratories, Syracuse, N. Y. This book contains interesting reference information on modern woodworking shop and finishing room practice. New materials, methods and practices introduced by the paint and varnish industry during the past decade are described in detail. Cabinetmakers, wood finishers, painters and decorators will find that this book provides the foundation which will enable them to solve many of the problems that they come in contact with.

This book is 9½x6¾-in. in size, contains 388 pages, is indexed, illustrated, and bound in an attractive brown leatherette binding lettered in gold. Price $5.00

just one in

50 YEARS

the first really new development in the last half century in the field of Wood-finishing has recently been released by the Spruance Research Laboratories.

NON-GRAIN RAISING

5856 SOLVENT

Patent applied for

FOR WATER SOLUBLE

ANILINE STAIN POWDERS

so much needed and so useful where matching special shades is constantly required. Convince yourself. Try this new solvent with the latest shades.

4794 ANTIQUE PROVINCIAL
4791 WALNUT BROWN

Send to us for samples and get the newest in correct Provincial shades.

WOOD FINISHING PRODUCTS

SPRUANCE QUALITY

THE GILBERT SPRUANCE COMPANY

OFFICES ✦ WORKS ✦ LABORATORIES

Richmond and Tioga Streets

Philadelphia, Pa.

New Materials and Equipment

Presenting briefly, certain outstanding features of new or improved materials, supplies and equipment which have been developed and made available for use in modern industrial finishing departments

Dry-O-Graph Times Drying

The Parks Equipment Co., Bourse Bldg., Philadelphia, Pa., announces the development of the Dry-O-Graph, a practical drying-time meter which when put into operation on tests automatically reveals the length of time required for a representative coating of finishing material to become really dry.

The apparatus comprises a Telechron motor, a 36-in. track and a brass cylinder weighing one kilogram. The motor operates a shaft 1-in. in circumference, moving at the rate of one revolution per hour.

The "track" is a shallow oak trough 2⅝-in. wide, with the bed set down ½-in. between the side flanges. The cylinder or roller is 2-in. wide and is covered with a corrugated rubber band. The cylinder is drawn along the track by the shaft of the motor at the rate of 1-in. hourly. The test strips are of tin, machine cut, 1-in. wide by 26-in. long, and after being coated are laid singly, or in pairs, side by side in the trough.

In operation the cylinder lays over the test strip, a strip of flannelette at the rate of 1-in. per hour, and at the completion of the test, when the flannelette strip is separated from the test strip, the distance to which lint has adhered, measured in inches, fixes the exact time when the sample was finally dry.

The machine after being started, requires no further attention until the test is complete.

New Resins—"Rezinels"

A new series of resins are now being produced and marketed under the name of "Rezinels"—by Glyco Products Co. Inc., Bush Terminal Bldg. No. 5., Brooklyn, N. Y. They are of particular interest in paints, lacquers, varnishes, printing inks, adhesives, rubber cements, etc., because they promote adhesion to smooth surfaces like tin, brass, steel, glass, porcelain, china, stone, plastics, etc. Furthermore they act as plasticizers and promote flexibil-

The test strips may be filed for future reference and can be photographed, if necessary, to facilitate correspondence regarding drying time.

WOOD LACQUERS PLASTICIZED with LINDOL

(TRICRESYL PHOSPHATE)

1. Build and adhere.
2. Flow smoothly and rub freely.
3. Dry hard but flexible with little shrinkage.
4. Remain clear, flexible and lustrous.

due to
COMPATIBILITY and SOLUBILITY

To test compatibility, make up a solution of pyroxylin, resin, Lindol and solvent only. Note its clarity.

To test solubility, add non-solvent to a Lindol plasticized lacquer. Note the quantity necessary to cloud the film.

Lindol has stood the time test of service.

It is non-volatile, moisture resistant, colorless, odorless, and non-inflammable, offered in two grades.

LINDOL — Chemically Pure.
LINDOL A — Technical grade.

WOODFINISHERS: Specify Lindol plasticized lacquers and improve the quality of your finish.

LACQUER MANUFACTURERS: Send for sample of Lindol and technical data.

CELLULOID CORPORATION

Chemical Specialties Division

10 East 40th St. **New York City**

ity in many types of coatings. They are soluble in benzol, toluol and naphtha.

Where other solvents are used they are first dissolved in a hydrocarbon solvent and then there may be added varying amounts of non-solvents such as alcohols, esters, ethers, etc. The rezinels are compatible with nitro-cellulose and give additional strength to lacquers. They are free from acidity and will develop no acidity with age. In addition they are exceedingly stable and will not react with other ingredients. They are uneffected by air oxidation, and alkali, acid or salt exposure as ordinarily encountered. Their water and electrical resistance are excellent.

In cellulose acetate, nitrate and cellulose textiles and wrappings, they may be used to advantage because of their waterproofing and other properties.

In rubber and rubber cements they are useful in giving greater ease in working up batches, acting as softeners and extenders of special properties.

Sticky products useful for adhesive tape, fly-paper, and coating for catching insects on trees are prepared by adding a little kerosene or other solvent to one of the softer rezinels.

The rezinels are polymerized terpenes which are light brown in color. The first grade produced is called Rezinel 1 and has a melting point of 97° F. Rezinel 2 is a non-drying liquid modification. Rezinel 3 has a melting point of 140° F.

Safety Clamp Carboy Tilter

The Schwenk Safety Device Corp., 70 E. 45th St., New York City, announces that an improved safety clamp has recently been

Fits cleat of any carboy box.

added to the Schwenk safety carboy tilter, the one man safety device for handling and pouring carboys of acids and other fluids. The new feature is a grip designed to fasten the bow shaped elements to the cleat of the carboy box and thereby provide absolute assurance against the carboy slipping or sliding from the tilter. The clamp is adjustable to fit carboys of any size, and grip the cleat on all carboy boxes. Three wing nuts fasten the clamp securely to the cleat.

Crystal Finish; "Zelactite"

The Zeller Lacquer Mfg. Co., 20 E. 49th St., New York City, announces to the industrial trade a new series of lacquer grades for crystalline finishes, under the brand name of "Zelactite." The name "Zelactite," though compounded from the trade name "Zellac" by which the entire Zeller line is identified, is intended to suggest the mysteriously intriguing effects found in the depths of shadow and the complex crys-

ZELLAC

More for Your Money

The crying need of today is *economy in terms of lower production costs.* And when it comes to the important question of finishing materials, the surest way to production economy is to buy for *greater value.* With Zeller, the first factor of lacquer making is to produce each grade with an unquestionable fitness for a specified purpose, in the particular field of use where required. That means *a better finish!* The second factor—and always second—is to produce these absolutely satisfactory grades in such a scientific manner as to reduce finishing costs to the minimum. And that means *finishing economy!* From Zeller you *can* expect more for your money.

ZELLER LACQUER MFG. CO., INC.
20 East 49th Street, New York City

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SAN FRANCISCO
SEATTLE

ZELLER

Kindly mention INDUSTRIAL FINISHING when writing advertisers

talline needle-point massss that exist in caves, where there is a formation of stalagmites and stalactites. Indeed, close examination of the dry finish itself reminds the observer at once of these futuristic shapes, with their curious patterns of criss-crossing light and shade. Many manufacturers of articles requiring novel and modernistic effects have recently found quite a vogue in the crystalline lacquer finishes.

The practical specifications of Zelactite are summed up by the manufacturer as follows. No baking is required in the application of this material. It is a one-coat finish, lending itself to low production costs for the user, and speed of finishing. Zelactite is of a rapid air-drying nature. It is applicable directly to metals, woods, compositions, glass surfaces, etc., or for that matter to almost any reasonably smooth surface which is not too absorptive . . . is supplied ready for use, for spray or dip application. The Zelactite grades are of four types: (1) in the clear form for use as such; (2) in the clear form for use with metallic powders; (3) in the translucent form containing colors; and (4) in the opaque form containing color pigments. Any color or shade can be provided.

In each of the four types mentioned, Zelactite is produced in three different sizes of crystals, small, medium and large. Each of these crystal sizes can be increased proportionately according to the heaviness with which the material is applied. Conditions existing during and immediately after application, however, must be taken into consideration. For the most satisfactory and uniform results it is desirable that the finish should be allowed to harden under conditions of quiet atmosphere without movement of air currents and under normal temperatures. Air currents passing over the work, and extremes of temperature will have their influence and sometimes impair the finish.

Air Conditioner

Andrews & Co., Perry Payne Bldg., Cleveland, Ohio, announces an air conditioner or air separator

Easily installed, quickly drained

which, when inserted in the air line near an outlet or connection for spraying or pneumatic machine operation, cleans the air of any oil, moisture or foreign matter it may contain.

The conditioner is of one-piece cast aluminum, is tapped for a

Air-Washed Paint Spray Booth

(Patented)

Portable or Stationary

Convenient - Safe - Economical

THE stationary type can be located any place in the plant as this installation, stationary or portable, requires no stack. Used air is washed and returned to room, or can be discharged outside.

Eliminates all fire and explosion hazards and meets all Underwriters requirements, all state laws and local ordinances.

Improves Ventilation — Saves Heat
Conserves Workers' Health

Grand Rapids Blow Pipe and Dust Arrester Company

Dust Collecting Systems 527 Monroe Ave. Grand Rapids, Michigan

FOUND IN A SERVICE ENGINEER'S

ARMS . . and the

Three hundred radio cabinets spoiled. What was wrong?

THE situation was serious. Twenty-five per cent of the radio cabinets showed an imperfect finish. On the top, right along the front edge, the lacquer crawled. Three hundred cabinets spoiled already.

The manufacturer sent for a du Pont representative. "It must be the lacquer. And the lacquer comes from du Pont."

A du Pont service engineer came and listened to the story. He spent an entire day in the plant. He saw the sealer sprayed on. He followed the cabinets as they went down the line of touchers-up. And then—*the mystery was a mystery no longer.*

Twelve men were in the line of touchers-up. Three or four of them laid their arms on the tops of the cabinets. The service engineer told the foremen to order these men to keep their arms off the cabinets. *And the lacquer finishes at once began to come through perfectly.*

Perspiration and natural oil from the skin were left on the cabinet tops. The lacquer would not adhere to these spots. It crawled and crinkled.

* * *

Here is only one incident in the crowded life of this du Pont service engineer. This man is expert in the application and use of finishing materials. His chief concern is to show manufacturers how to gain more beautiful and lasting finishes for their products . . . how to help correct uneconomical practices in the finishing of those products . . . how to use du Pont paints, varnishes, lacquers and Duco to save time and money.

The work of these men is made so much easier because of the du Pont finishes they employ. Du Pont materials are designed, produced and tested to give furniture finishes of enduring beauty . . . and thus to increase their value and salability to the consumer. If you are interested in knowing about the possibilities in du Pont finishing materials and systems for your products—if you have any problems in the application of your present finishes, call upon us. To gain this co-operation simply address:

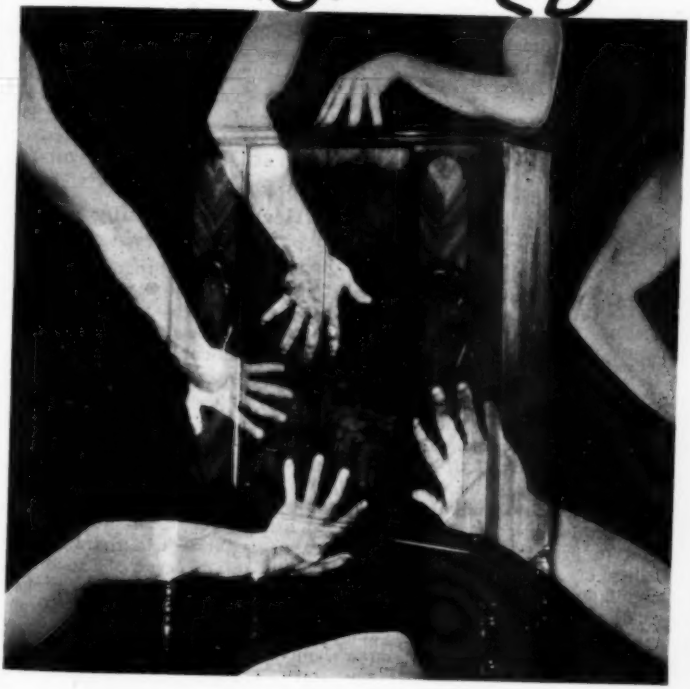
* * *

DU PONT

E. I. DU PONT DE NEMOURS & CO., Inc. Industrial Finishes Division, Parlin, New Jersey; Chicago, Illinois; San Francisco, California; Everett, Massachusetts. Canadian Industries, Limited, Paint and Varnish Division, Toronto, Ontario, Canada.

NOTEBOOK . . . STORY NUMBER 1

LACQUER that CRAWLED



⅜-in. pipe thread and contains no packing or absorbing material to require repeated servicing.

Turning the petcock at the bottom permits the interior of the conditioner to be "blown out" under pressure freeing it from any collected oil, water or sediment.

Spray Gun for Airplane Dope

The DeVilbiss Co., Toledo, Ohio, manufacturers of DeVilbiss spray-painting and finishing equipment, announces a new spray gun, known as the DeVilbiss Type BD,

"Considered a great improvement."

especially designed for use by the aviation industry in the application of airplane dope, and other viscous materials. After having passed the severe tests imposed upon it in the DeVilbiss laboratories, this new spray gun has been in practical service in the plants of a number of aircraft manufacturers for several months.

The new DeVilbiss spray gun, having been designed for dope and similar materials, operates on a principle different from that employed in the ordinary paint or lacquer spray gun. Fluid leaves the nozzle in the form of a thin walled tube with air under pressure within the tube. This air splits the tube longitudinally. The air, issuing from around the outside of the fluid tip, tears these longitudinal sections crosswise. This insures greater atomizing efficiency, and an even distribution of dope over the surface.

The gun is so designed that it may be operated continuously for long periods without tiring the operator. It is an aluminum alloy forging giving lightness, strength, and long wearing qualities. The trigger is nickel-plated and provides a full two-finger grip.

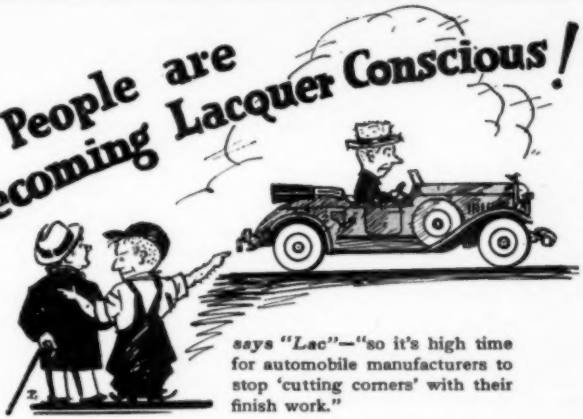
Its efficiency in fast work, and its power to deeply penetrate the material into the fabric and evenly coat the surface to any desired thickness is expected to result in finer and more efficient fabric finishing at lower production costs.

Heater for Baking and Force Drying

The Nichols Products Corp., 12953 Greeley Ave., Detroit, Mich., announces that its 1931 air heater (oil or gas fired) is efficient and economical for such processes as baking japans and enamels; drying paint on automobiles and metal furniture, etc.

The burners are of the atomizer type using compressed air at 5 to 20-lbs. pressure. The compressed air is projected through an orifice over the oil nozzle which connects through the burner body to the oil reservoir. The oil in this reservoir is under atmospheric pressure only. The air passing over the oil nozzle produces a vacuum which raises the oil to the tip of the nozzle where it meets the jet of compressed air and is sprayed into the combustion chamber in the form of a very fine mist. Perfect combustion is obtained at all capacities within the range of the burner.

People are Becoming Lacquer Conscious!



says "Lac"—"so it's high time for automobile manufacturers to stop 'cutting corners' with their finish work."

The fact that many lacquer jobs lose their luster and "new" finish in a short time is becoming more widely known among car owners. This will undoubtedly cause a negative condition in the minds of owners that will reflect upon the automobile manufacturer. People will not buy a "short-life" finish car.

The wise automobile manufacturer is specifying lacquers whose thinners are *properly formulated* with

PENTASOL AND PENT-ACETATE

for he knows that his lacquer finishes will "stand-up" under trying conditions.

SHARPLES TRADE MARK SOLVENTS

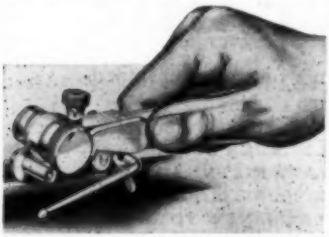
The SHARPLES SOLVENTS *Corp.*
2304 WESTMORELAND ST., PHILADELPHIA
548B RAILWAY EXCHANGE BLDG., CHICAGO
501A FIFTH AVENUE, NEW YORK CITY

The Nichols method of proportioning the amounts of oil and air makes it a simple matter to control the capacity by merely varying the air pressure.

Important merits of the new heater are: (1) No direct flame touches tubes. (2) No special alloy required for tubes. (3) No special protection required to keep tubes from burning or distorting. (4) No costly repairs due to burning of metal tubes. (5) No special tiles—our tiles or standard firebrick may be used. (6) Inspection door provided to clean out combustion chamber and tube stack without disturbing insulated duct work. (7) Recorder controllers may be installed to ascertain temperature of individual heaters when set up in groups. (8) Dampers arranged to control quantity of gases to the stack. (9) Heaters designed for low headroom with no duct on top.

Mechanical Striper

The newly announced "Lightning Rotary Striper" made by Motor Industries Co., LaCrosse, Wisc., is designed primarily for automobile striping by the workman without previous experience; "invented by a practical painter—with years of experience in operating auto paint shops; perfected by practical mechanics, to do perfect striping easier, quicker, and at far less cost."



A little wheel revolving in color "rolls on" the striping material.

The unique feature about this new striping tool, which is precision built, is a rotary disc or wheel that continually bathes in striping color and "rolls the stripe on" evenly and accurately. Adjustable guides which follow along beads, mouldings, and edges insure a perfect job. Easily cleaned, nothing to get out of order, simple to adjust and operate.

A clever feature is the automatic trigger. Simply press it lightly with the thumb or finger, and the rotary disc is released into position, permitting striping material to feed evenly and regularly. It automatically shuts off upon release of trigger pressure.

Color Mixtures for Various Tints, Shades and Hues

This article, by request, continues with the list of color mixtures appearing in two previous issues of INDUSTRIAL FINISHING (July page 60, Sept. page 56).

When mixing colors, it is always advisable to choose a reliable brand of tinting colors and stick to that make; otherwise, the color that is prepared may be of a different tone or shade, even though the usual formula is followed.

Imperial Blue

White .....(parts by weight)	2
Ultramarine blue	2

Independence Blue

White	2
Prussian blue	1

India Buff

White	88
Raw sienna	12
Lamp black	1

Indian Brown

Light Indian red.....	50
French ochre	50
Black	50

Snuff Out Lacquer Fires with a Clean, Harmless Gas

FIRE dies a quick death under the penetrating cloud of Lux gas. And after ventilation, the premises are left in the same condition as before.

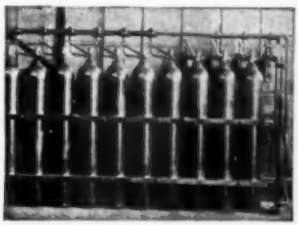
There is no interruption in production for clean up after the fire... no loss of the lacquer in a dipping tank or damage to an oven by the extinguishing agent. For Lux gas—carbon dioxide—is clean, harmless to all substances and dry.

The principle of the Lux System is simple and effective. The operation of thermostats in the protected space releases carbon dioxide gas from its containers. A simple distributing pipe system fills the burning area from floor to ceiling with the gas. Flames die instantly, for they cannot exist in air containing so little as 15% of carbon dioxide.

The free booklet, "Snuffing out Fire", will give you complete information.

Walter Kidde & Company, Inc.
140 Cedar Street
New York

LUX
DRY—HARMLESS
FIRE EXTINGUISHERS



Indian Orange

Deep chrome yellow	20
American vermilion	1
Burnt sienna	1

Indian Pink

White	100
Indian red	1

Invisible Green

Deep chrome green	8
Lamp black	3

Italian Blue

White	234
Prussian blue	3½
Light chrome yellow	½

Italian Villa Pink

White	50
Raw sienna	1
Burnt sienna	2

Ivory

White	98
Raw sienna	1
Lemon chrome yellow	1

Ivy

Raw sienna	42
Prussian blue	2
Lamp black	1

Jade

White	110
Light chrome yellow	½
Prussian blue	1

Japanese Red

American vermilion	3
Alizarin crimson	1

Jasper Gray

Drop black	9
White	2
Orange chrome yellow	(touch of)

Jersey

White	88
Raw sienna	2
Burnt sienna	1

Jonquil Yellow

White	100
Light chrome yellow	1
Medium chrome yellow	½
Prussian blue	(touch of)

Kashmir Gray

White	47
VanDyke brown	2
Medium chrome yellow	1
Lamp black	1

Kitten (Gray)

White	20
Drop black	1
Raw umber	(touch of)

Kobe Red

Venetian red	3
American vermilion	1

Lavender

White	25
Ultramarine blue	2
American vermilion	1

Lead Color

White	100
Lamp black	2

Leaf Brown

Burnt umber	12
Medium chrome yellow	8
Venetian red	2

Lemon Cream

White	100
Raw sienna	25
Lemon chrome yellow	1

Lettuce Green

White	25
Light chrome green	2
Light chrome yellow	1

Lilac (1)

White	50
Ultramarine blue	2
American vermilion	1

Lilac (2)

White	96
New Tuscan red	3
Ultramarine blue	1

Limestone

White	100
Raw sienna	6

Light Olive

White	75
French ochre	15
Medium chrome yellow	5
Raw umber	6
Drop black	5

Light Pink

White	50
Bright vermilion	1

Livery

White	100
Medium chrome yellow	2½
Lamp black	¼
Venetian red	1

Lizard Green

Medium chrome yellow	5
Lamp black	1

Llama Gray

White	100
French ochre	6
Venetian red	¼
Lamp black	1/16

London Gray

White	100
Lamp black	¼
Prussian blue	1/16

Lucrene Blue

White	6
Cobalt blue	1

—J. K. Cooper

Metal Finishing Department

Cleaning-Handling Baking & Polishing

Machinery Finishing

Preparing smooth and blemished metal surfaces for the finish; using primer or surfacing primer followed by sanding and the final coats; baked finishes; the finishing of oil reservoirs and the treatment of brightly polished or machined surfaces

By E. PERRY

IN THE FINISHING of machinery, one of the most important features to consider is the initial preparation of the surface, which should be free from rust and oil or grease. In the large factories, rust is most completely removed by sandblasting; but without sandblast equipment, good results can be accomplished by means of wire brushes and the various abrasive cloths. The removal of loose rust should be followed with a washing off of all oxide, using benzine or preferably a mixture of three parts of benzine and one part of alcohol.

It has long been known that a weak aqueous solution of phosphoric acid will produce a surface of iron phosphate on iron and steel, and such surface is then rustproof under ordinary atmospheric conditions. The recommended proportions for a solution that will completely alter deep rust to the form of insoluble phosphates, is a mixture of 35 parts of pure phosphoric acid, 20 parts of glucose or glycerine, and 45 parts of water—all by weight. This may be applied cold with a clean brush and left for 24 hours; then washed off with strong soapy water, rinsed with clean water and dried.

The process is very efficient, but attention is directed to the fact that this is pat-

ented, although it may be used under license. There is a material on sale (name on request) which is of this character —and the well-known Parkerizing process is a modification of it, too.

Treating Blemished Castings

Regardless of every effort in the foundry to produce perfect castings, some surface defects cannot be avoided. Fortunately it is possible to treat blemished castings pitted with blow-holes, so that to all appearances and usefulness they are practically the same as perfect castings. This repair is accomplished with an iron cement in dry powder form, to be mixed with water for using; the putty so formed can be used for filling blow-holes and sand holes in castings, closing the pores in spongy iron, surfacing a pitted condition, filling up countersunk fastenings to be flush with the machine surface, etc.

The putty hardens in a few hours, dependent on the depth of the filling; and as will be recognized by its composition containing a large proportion of metallic iron, the resultant patching will so closely resemble the natural casting as to be difficult of detection. The formula follows:

Iron filings	64-lbs.
Plaster of Paris	10-lbs.
Common whiting	4-lbs.
Gum Arabic, (pulverized)	4-lbs.
Bone black	1½-lbs.
Portland cement	4-lbs.

Combine the ingredients in their order as given, preferably by a mechanical mixer if one is available; and keep the powder in a container which can be closed tight to exclude dampness. The iron filings should be as fine as possible—never coarser than what will pass through a 20-mesh sieve. Where quicker hardening is desired, the whiting may be replaced by a like amount of more plaster of Paris.

When preparing to use this material mix only the quantity to be immediately needed, mixing it in bulk proportions of one part of water to six parts of the powder to form a stiff putty. It does not take up water readily, therefore continuous stirring is necessary, and ultimately a soft pliable putty will result. *Do not add more water unless absolutely required.* Finally finish working up the mass in the hands as with ordinary sash putty.

Apply this putty by whatever means the particular job demands; a stiff putty knife or glazing knife is useful to force it firmly onto a pitted or rough surface. Cracks and holes should be filled by forcing the putty in by hammer taps, and then smoothing over the surface. Cavities deeper than ¼-in. should not be repaired in one filling; the putty should be forced in to ¼-in. stratas and each allowed sufficient time to harden before continuing. Holes and their like should be treated first before the final surfacing is done.

The components utilized in this iron cement possess the essential properties for close and firm cohesion without subsequent contraction and, if the repair is well done, the cement will not later loosen and break out. By actual test, a cubic inch of the dried or hardened putty has withstood compression of 6,000-lbs.

Primer; Surfacing Primer

The primer advised for a first coat on the bare metal is the type supplied ready for use on automobile bodies, and the consistency is applicable to both brushing and spraying. For machinery, brushing is preferable to insure working it

MODEL 1931

NICHOLS Air Heater

The only air heater in which the tubes do not come directly over combustion chamber. A new advanced method of heater construction that obviously effects substantial savings in repairs and maintenance costs. Other exclusive Nichols features include low headroom design, capacity control and inspection doors. This 1931 Nichols Heater presents a new, greater measure of heating efficiency and operating economy.

Our Bulletin 108 gives detailed description. Copy sent on request.

NICHOLS PRODUCTS CORPORATION

12953 Greeley Ave., Detroit, Mich.

NEW YORK CLEVELAND CHICAGO PITTSBURGH PORTLAND, ORE.

Ross Engineering of Canada, Ltd., Montreal, Canada

well into the pores of the casting and around boltheads, etc. An oil-type primer of this kind is very tough and elastic, adheres perfectly, and is an excellent foundation for binding the subsequent coats.

An alternative material, very much in favor in some of the largest shops, is a surfacing primer carrying considerable more pigmentation. As its name implies, it is a combination possessing a specially prepared vehicle with the tenacity of a separate primer, and having good filling properties. Although being a full-bodied paint, it is ready for use without reduction, atomizes beautifully in spraying, and levels perfectly. It dries overnight almost flat, and requires only a minimum of sanding down preparatory to a second coat of the same material.

The use of this material, produces a more-rounded-out job in less time than a coat of ordinary surfacer over a coat of regular primer. It can be surfaced down with fine sandpaper, or pumice block and water.

Castings that are sufficiently uneven and porus or pitty would require the usual machine filler in paste form, to be knifed or strapped on (using a piece of belt leather) and, after drying, to be surfaced down free from ridges and smooth for the reception of subsequent coats. A partial filling may be done and the surface roughly sanded down; then apply a full coat of the surfacing primer, and smooth out the whole job for the next or sealer coat.

It should be timely advice herein to mention that in brush work of the foregoing materials, each alternate coat should be crossed or brushed at right angles to the preceding coat, as by so doing the resultant surface will be more uniformly level than when all brushing is in the same general direction, which builds up ridges impossible to eradicate.

Sealer and Finish Coats

The sealer coat is generally offered in black, grey, green, red, and maroon. In this way the sealer not only renders the built-up surface non-porus, so that the finishing coat will hold up to the best advantage, but also acts as the ground coat so that the full shade of the finishing color will be brought out. Any sanding of this coat must be done carefully with very fine finishing paper to avoid cutting through, as that would cause flatting and produce inequality of the final finish.

The finishing coat may be either the customary oil-proof machinery paint, which produces a half-flat or velvety finish impervious to the action of lubricating oils; or it may be any of the gloss machine enamels, or one of the present popular 4-hour enamels providing it is the kind that will withstand the solvent action of oils.

If the engine or machinery is to be tested, this should be done prior to finishing and before the sealer is sanded. Following this, any oil on the surface should be removed with benzine.

Oil Reservoir

The interior pockets of some castings used as reservoirs for lubricating oil, in the finish machine, require to be coated to keep the oil clean and free from particles of sand that might work into the bearings. Aside from this sand which comes from the mold in casting, there is also more or less metal grits from the machining operations; these are difficult to

A New Low-Bake REZYL for Primers, Surfacers and Enamels

Rezyl 110 is one of the Rezyls that are proving highly advantageous to manufacturers of bake-type primers, surfacers and enamels.

Durability is assured because Rezyl 110 is opaque to ultra-violet light rays and resists their destructive action.

Formulation is simplified because Rezyl 110 is completely and rapidly soluble in coal-tar and petroleum hydrocarbons, oils and turpentine. This property makes Rezyl 110 particularly adaptable for quick drying types of industrial paints.

In many Nitrocellulose lacquers where toughness, adhesion and durability are essential, our synthetic Rezyl 110 is both suitable and economical. Write for samples of Rezyl 110, mentioning the name of your lacquer supplier, and indicate which of our other products you are interested in: Rezyl Balsams for plasticizing; Teglac for furniture finishing; Ethyl Lactate, the high-boiling solvent; and Nitrocellulose.

Sole Sales Agents for the Nitrocellulose produced by our Subsidiary, American Powder Company

Industrial Chemicals Division

American Cyanamid Company

535 Fifth Avenue New York

eliminate entirely and must be bound or set to prevent them from getting into the bearing surfaces.

The procedure is similarly followed in the large automobile plants prior to assembling the transmission. The material is brushed onto the inside of transmission cases to bind the foundry sand which otherwise would be abrasive in the bearings and gears when assembled. It is customary to use a shellac paint (for example, 2-lbs. of bright iron oxide ground into one gallon of orange shellac varnish). The straight shellac is not recommended because, without pigmentation, it would be difficult to see that the coating was uniformly applied over the entire surface.

Should a white or light shade of paint be desired in these oil recesses, the spirit varnish can be made with white (bleached) shellac varnish, and pigmented with titanox or cryptone whites. This color or finish would be recommended for exposed pockets in machinery. Pyroxylin lacquer also is adapted for the usage just explained, but it does not adhere well if the iron or steel happens to be oily or greasy; and since it is not always possible to have these recesses absolutely clean, a lacquer sealer is not so reliable for this purpose.

"Slushing Oil"

In preparing machinery for shipment, manufacturers generally coat the machined surfaces with some form of "slushing oil" to prevent rust or corrosion. Frequently this coating consists of petrolatum (vaseline), but the following compound is preferable, as it can be more easily applied and removed: Mix 6¼ gallons of paraffin oil with 25-lbs. of vaseline or No. 3 cup grease, stirring the oil into the vaseline. The stirring should be continued until all the oil is taken up by the vaseline. These quantities produce about 10 gallons of "slushing oil", but any required amount can be made by mixing paraffin oil and vaseline in the same proportion of 4-lbs. of vaseline to one gallon of paraffin oil.

Some machinery makers prefer a white coating, which can be made from the same materials, and adding 1½-lbs. of lithopone to each pound of vaseline used. The vaseline with the pigment should be thoroughly mixed by stirring before incorporating the paraffin oil. In some cases it is desired to use a slushing oil which partially dries or sets. For this type the compound is made by mixing together 4-lbs. of the same vaseline, 1¼ gallons of paraffin oil, and one quart of rosin oil.

This System Not Passé

To many finishers the foregoing schedule for finishing machinery may be considered passé, and so it was more or less until recently; but I have in mind several makers of fine equipment who turned to lacquer finishing and now, after two or three years experience with lacquering, have gone back to the former paint and varnish finishing. Some of these, to expedite their finishing work, have adopted baking finishes for both the undercoating and enamel. One concern whose product is quite large, handles it very conveniently by overhead conveyor traveling slowly through two separate tunnel-type ovens.

Someone once said that "the value of a man is in inverse ratio to the supervision he requires."

Finishing Metal Color Displays and Racks

By C. E. KARST

Superintendent of Brunhoff Mfg. Co., (point of sale displays) Cincinnati, Ohio, explains in detail how the metal is cleaned and finished and emphasizes the extreme care used in protecting some of these products from dust and flying particles

IF I WERE asked to name the products we manufacture, I wouldn't know where to start. Work in an advertising novelty shop includes fashioning and finishing in both glass and metal, in sizes ranging from pieces no larger than a silver dime to signs 4 x 6-ft. The finishes used are even more diversified than the products.

We have a department where experiments are continually in progress to develop new finishes, color blends and finish combinations, because in this business the reward goes to the establishment that is able to produce the most unusual and attractive design and finish. To suggest something of the nature of our work, I have selected the color display panel and rack illustrated at the top of this page for discussion.

This color display consists of a panel and 18 metal paint paddle samples. Twenty seven colors are used in finishing the entire display. All metal parts coming into the finishing department, whether separate or assembled, are placed on the conveyor of the washing machine shown in Fig. 2. Upon entering this machine the parts are sprayed under pressure with a chemical cleaner, then washed in clear water. Next they pass under a high pressure steam spray and are dried in the oven at the outfeed end of the washing machine.

After the metal cleaning operation the panels receive a spray coat of gray lacquer which forms the background color for this display. After drying about an hour the panels are taken to the silk-screen printing department. Nine colors are used in printing the advertisement which appears in the upper part of the panel, the various color names and the signature at the bottom. Nine separate silk-screen stencils are used in this operation, the colors being applied in the usual manner with a squeegee. Approximately one hour for drying time is allowed after the application of each color.

We make all of our stencils by

photographic reproduction. The original colored drawing is mounted in a fixed position before the camera and, in this instance, nine exposures are made of the drawing through various filters which separate the different colors. The result is that each plate contains reproductions of

Fig. 2—The washing machine through which metal parts are run to be cleaned

only the objects or parts of objects of one definite color on the original drawing. After developing, the plates are used in printing on sensitized silk which has been stretched taut over a wooden frame. Thus the nine stencils are made and each one is numbered consecutively. As each of these stencils is used in proper sequence to apply silk-screen colors on the panel, the layout is gradually formed and completed.

The paint paddle samples, as received from the fabricating department, are punched and cut to net width, with the top edge cut as shown in the illustration at the beginning of this article; each paddle is twice the required length to permit handling and racking. After passing through the washing machine, the paddles are taken to a special finishing room. This room is enclosed on all sides and contains only one small door. The entire inner surface, with the exception of the floor, is covered with paper which has been heavily coated with cup grease. The floor is oiled and the operatives wear oil-leather suits which, of course, give off no lint whatever. All of these precautions are necessary to produce the smooth glossy finish required for these paint samples.

The various paints or enamels are obtained from the paint manufacturer, so that the samples will indicate the true colors and the quality of finish possible with this material. Paddles are dipped in the various colors by hand, the operator holding each paddle by the lower section and then placing it in a slightly tilted upright position, in a draining-drying rack. The paddles reman in these racks to dry inside a dustproof room for about 36 hours. Drying is facilitated by a small exhaust fan mounted above the room, air being filtered through a cloth screen.

Some of you may consider that we have carried dustproofing to an extreme, but I have found that

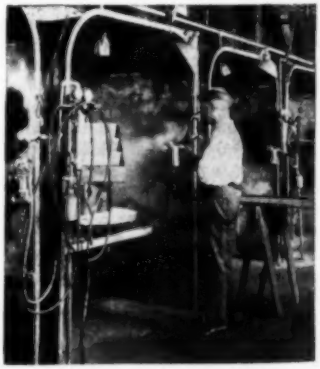


Fig. 3—At the spray booths

DIPPING LACQUERS

By absolutely novel formulation, we can now present a line of dipping lacquer enamels of most unusual qualities.

Irregular shapes and long and complicated pieces are covered solidly, without bead or sag: in one coat for most colors. Wire objects are perfectly finished in incredibly economical fashion.

For many industries, this will be as important a development as the spray gun, which it will replace for a diversity of purposes.

Allow us to give you fuller details by writing, with description of your product, to

THE VARNISH PRODUCTS CO.
12900 Berea Road
Cleveland, Ohio

Armitage ARMORLAC LACQUERS VARNISHES ENAMELS

ARMORCOID

Trade Name

Synthetic Enamels

(Baking or Air Drying)

The paint manufacturer's closest approach to a porcelain finish in enamel.
Has unusual adhesion — hardness of baked finish — high gloss or dull — quick bake. High solids give exceptional build and toughness without brittleness.
Available in one coat white, black and solid colors for metal furniture, refrigerators, etc. Technical advice gladly furnished.

It stands the test!

John L. Armitage & Co.
Established 1876
NEWARK, N. J. and DETROIT, MICH.

BUILDING A GOOD FINISH

A good finish is lasting, durable and attractive.

XCEM specialized cleaners insure a lasting and durable finish as their use guarantees an absolutely clean surface.

No chain is stronger than its weakest link. No finish on your products is better than the initial cleaning job.

Avoid costly complaints and rejections by using XCEM Products for all your cleaning jobs.

We guarantee that XCEM Products will do your cleaning Quicker, Better and at Less cost. May we give a demonstration.

Please Write To

Magnuson Products Corp.

Specialized cleaners for every Industrial Purpose

Hoyt and 3rd St. Brooklyn, N. Y.

WAREHOUSES

CHICAGO BALTIMORE DETROIT
TOLEDO INDIANAPOLIS
ATLANTA MONTREAL LOUISVILLE

Representatives in all Principal Cities

it is far more economical to (1) be extremely careful in preparing and cleaning the metal surface to receive the finish, and (2) exercise an equal amount of care in applying the colors and preventing the circulation of dust and lint, than it is to follow the usual procedure and do a lot of refinishing. Paint and enamel paddle samples must be not only true to color but they must approach perfection as a limit in the quality of workmanship.

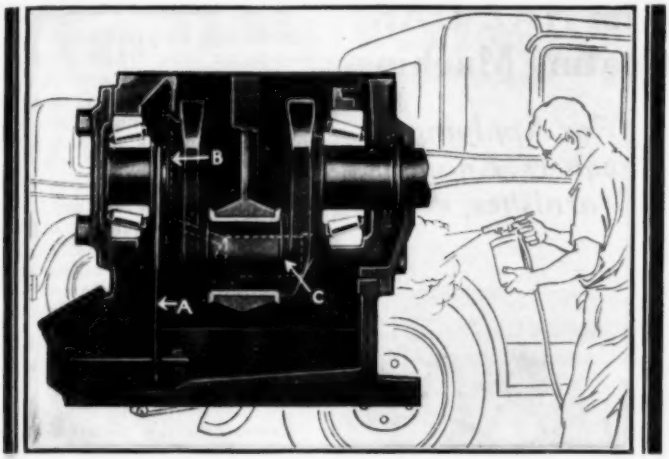
The paint paddles are then cut to net length and attached to the panel by brass eyelets.

Display racks, one of which appears at the beginning of this article are made in various sizes and are used in connection with these color displays, or separately. The one shown here is finished in a green crystal finish. Racks are assembled in the fabricating department and are thoroughly cleaned in the washing machine. Then they receive a spray coat of green crystal enamel (oil base) and are baked for 30 minutes at 175° F. in an oven that has been purposely fouled. The green crystal finish results.

Bronze Powders for Industrial Use

The Illinois Bronze Powder Co., 564 W. Monroe St., Chicago, Ill., announces that it carries a complete line of diversified bronze powders for industrial use. According to the company, "these bronze powders are obtainable in various shades and colors for general decorative work where brilliant metallic luster is desired in contrast to flat pigment colors. These bronze powders are all produced from a pure metal base, the shades are obtainable by variation of basic alloy, heat coloring, dyeing, with aniline colors or mechanical mixture of them." This company also states that it carries a line of aluminum bronze powders which will produce a fine, smooth, and brilliant finish.

Upon request, this company offers to send a sample color card showing a few of the various shades in which bronze powders are obtainable.



NO OIL SPOILED JOBS

Centro-ring Oiling Keeps Excess Oil Out of the Supply Line

Curtis Compressors provide the surest safeguard against oil in the supply-line by two patented exclusive features of design.

1. The Curtis centro-ring oiling system (Pat. Pending) delivers the exact amount of oil needed to working parts. A ring (A) lifts oil to under-cut groove (B) in crankshaft. Centrifugal force carries it through ducts through chamber (C) in crankshaft. Then centrifugal force redistributes it to ribs in the crankshaft, which lead the oil to each friction point to definitely control volume. No excess to get in the discharge line.

2. The Curtis suction valve type unloader avoids oil pumping due to vacuum. It operates on the suction valve so that when the machine is unloaded, the valves do not operate as with the suction port unloader.

Mail coupon for catalog describing these vital features and the many sizes of Curtis Timken Bearing Equipped Compressors for Paint Spraying, in both stationary and portable types.

CURTIS

CURTIS Pneumatic Machinery Company *St. Louis*

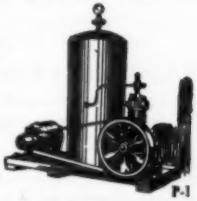
Curtis Pneumatic Mchy. Co.
1977 Kienlen Ave., St. Louis—5518-D Hudson Term., N. Y

Please send information about _____

_____

Name _____

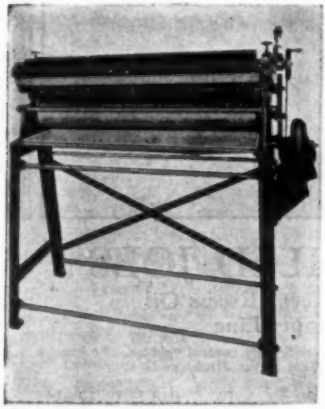
Address _____



P-1

The NAZ-DAR Coating Machine

For Applying Lacquers, Enamels, Varnishes, etc.



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CHICAGO, U. S. A.

Also Manufacturers of Silk Screen Process Paste Paints, Equipment and Supplies

Metal Cleaning Problem

One of our principal products is steel frying pans. These pans are polished and grained with oil and emery powder, then washed in benzine before the final protective coat of lacquer is applied. We have tried cleaning with hot water, soda ash, and a commercial cleaner. By this method, the cleaning is done quickly, but no matter how carefully we rinse and dry the article, rust spots develop before the protective coats of lacquer can be applied. We will appreciate any information on up-to-date metal cleaning.—J. N. & T. Co.

Every finishing department, I believe, finds the cleaning of metal the most difficult problem in connection with finishing. Each metal finishing job has its own individual cleaning problem. Differences in the kind of metal, size of articles, atmospheric conditions, and the location of the cleaning department—all these factors must be taken into account.

The question in my mind is just how your work comes through. First, do the same size pieces come through at the same time or do various size pieces come through together? Second, do you buy your steel from the mill with the usual coating, or from a jobber who might coat it with some rust preventative of his own? These and other questions you must answer and take into account when considering metal cleaning material and equipment.

Have you seen the new cleaning machines which have a cleaning, rinsing and drying compartment all in a continuous line, enclosed? The parts go in at one end and come out at the other end

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N 12

TAILOR-MADE FINISHES

We are borrowing this theme from a recent INDUSTRIAL FINISHING editorial wherein Mr. Rohr points his pen at the notable strides made by those lacquer manufacturers who *completely engineer* a finish. "A completely engineered or tailor-made finish," he says, "is based on a survey of the manufacturer's requirements, laboratory research, adequate testing. The lacquer manufacturer then prescribes the material and assumes full responsibility for the final result at the customer's factory."

We are pleased that such a message should issue "*From the Editor's Desk*," and we can only add that such specialized procedure is fundamentally accountable for whatever success we have won.

In the course of 1931 we propose to devote our advertising space to graphically detailing a number of our contributions to industry. Each in its own field represents a unique solution to a difficult finishing problem. In the meantime, if your interest in finishing takes in the use of materials, sprayed, dipped or coated on any of the substances listed below, we have very informative research bulletins to send, which you will undoubtedly be glad to place on file. *Merely indicate the subjects, and mail the checked slip, attached to your letterhead.*

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- ☐ GLASS
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- ☐ BRASS
- ☐ ALUMINUM
- ☐ ZINC
- ☐ STEEL AND OTHER FERROUS METALS
- ☐ DIE-CAST METAL

in tip-top shape. These machines range from 40 to 125-ft. in length and cost from $5,000 to $10,000 and upward. The General Fireproofing Co., at Youngstown, Ohio, have one of these machines, and it certainly does the work for them.

In the absence of such a machine, I suggest dipping as the next best choice.

Referring to my article beginning on page 62 of September 1930 issue of INDUSTRIAL FINISHING, will you please read the first paragraph under the centerhead "Metal Cleaning Equipment" on page 64? To continue from there, the next step necessary is to get rid of the residue resulting from the action of the volatile chemicals upon the oil. This is done by incorporating in the compound an ingredient to act similar to a sponge and take up this oily residue and retain it, so as to keep it from the metal surface in order that it may not again adhere to the metal.

This can be accomplished by the use of a material such as fuller's earth, which has the property of holding the oil in about the same manner as a chamois skin absorbs water. This absorbent clay retains the oil until it is wiped or brushed away, either by hand or by some mechanical means.

No further cleaning is necessary after a mild heat has been applied to dry up the absorbent clay compound and make it easily removable. After this operation, the surface is chemically clean.

It may be noted that this idea involves the substitution of a baking operation for either a tank cleaning or a spraying operation. Due to the fact that the volatile chemical solvents are of an acid form and therefore harmful to the general kind of spraying equip-

ment, it has been necessary to develop a special kind of spraying equipment which will handle the new cleaning material. In some instances, this has called for pressure tanks made of acid-resisting materials.

Whatever method you elect to try out, remember that in nearly all cleaning materials some action which regulates the degree of alkalinity is important. This is sometimes referred to as buffer action. Buffer action is the resistance to change the degree of alkalinity of a solution by either addition or dilution of other soluble materials. For instance, the solutions you have used may be buffered against acids, but not against alkalies, or vice versa.

I might add that about a year ago while assisting a firm cleaning small metal parts—namely, toys and small box covers—I discovered that the use of a vapor degreaser [manufacturer's name on request] would solve some of the many difficulties with which this concern had to contend. The loading chamber of this degreaser is 48x20x21-ft., and after the parts have been in it for 1½ minutes, they are cleaned thoroughly. This improved method cut the firm's costs of the actual work and has increased their heating capacity because the ovens are now used only for enameling.—Robert G. Mudge.

We are learning that it is not so much what we do as how we do it.

Armitage Opens Plant in Detroit

The John L. Armitage Co., Newark, N. J., announces that it has opened a plant at 5060 Edwin Ave., Detroit, Mich., for the production of a complete line of industrial and lacquer finishes. This plant was opened to serve the automotive and middle Western industries.

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Clear Crystal Lacquer Panel

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Latest Specialty
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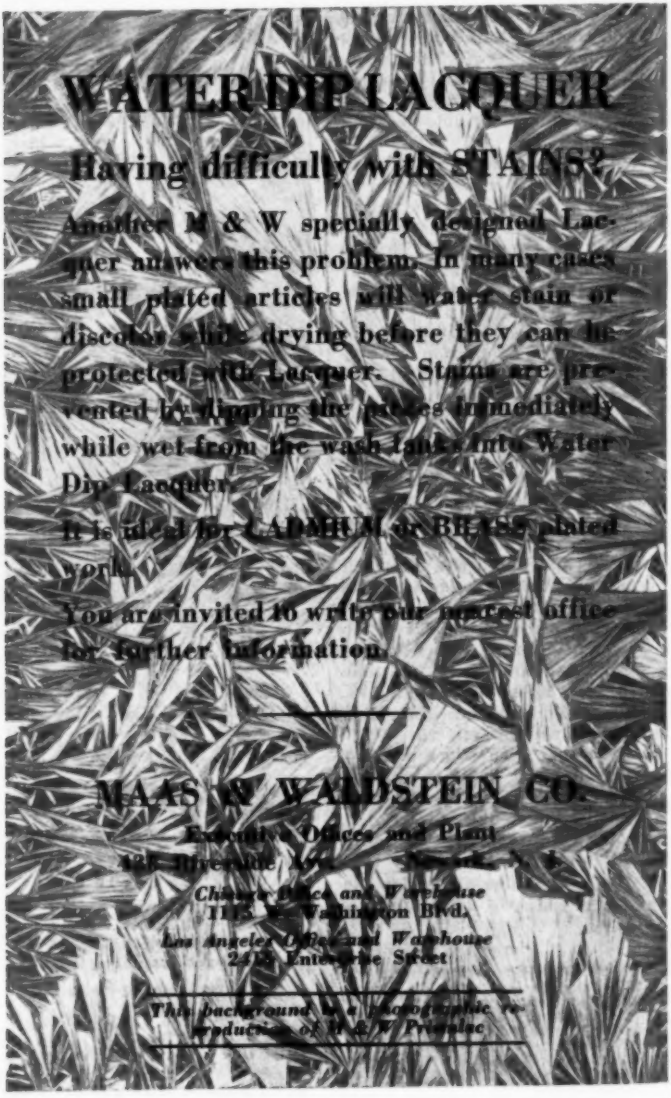
WATER DIP LACQUER
Having difficulty with STAINS?
Another M & W specially designed Lacquer answers this problem. In many cases small plated articles will water stain or discolor while drying before they can be protected with Lacquer. Stains are prevented by dipping the pieces immediately while wet from the wash tanks into Water Dip Lacquer.
It is ideal for CADMIUM or BRASS plated work.
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This background is a photographic reproduction of M & W Primalac

Questions and Answers

This service department is conducted to meet the reader's need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer any further comments or recommendations pertinent to subjects mentioned

To Remove Lettering From Aircraft Fabric

How can old oil, japan, or lacquer letters be removed and built up so as not to show "raised" through coats of lacquer applied after their removal? This applies to a fabric job. Suggestions on the striping, cleaning, and preparation of all-metal airplanes will also be appreciated.—G. L. H.

Oil or japan letters that have been applied to cloth surfaces of aircraft can be readily removed with the aid of a good varnish remover. Simply brush over the letters with two coats of the remover, and when they show signs of wrinkling scrape them off with a putty knife. In the case of lacquer letters, however, it is recommended that they be removed with "wetordry" sandpaper.

The procedures outlined above will remove the letters down to the dope base with which the panels or fuselage were originally finished and, if care is exercised, they will not show raised through coats of lacquer applied after their removal.—Charles E. Kirkbride.

Our experience in the removal of paint materials from fabric has been that only that portion which remains on the surface can be taken off, and this is done by the use of what we call a dope and lacquer remover. It is either sprayed or brushed on, wetting the surface quite a bit, and after the finish has been softened then removing with a scraper. One application of the remover may not be sufficient to thoroughly soften all the way through, and we suggest that the operation be continued until it is found that the built-up letters can be taken off easily by scraping.

Relative to preparation and cleaning of all metal airplanes, they of course should be cleaned the same as any other metal before being finished, depending entirely on the condition of the metal and the conditions under which the cleaning is to be done. —G. B. W.

Lacquered Paintings

Referring to G. Pitoni's question about "How to Finish Paintings to Produce Rich Effect" (Dec. issue, page 66), I have tried a few experiments and have found that if you take a painting or photograph and spray a good coat of clear lacquer on it and allow the painting to dry and then take a stiff brush, dip it into lacquer thinner, removing excess thinner from brush and then proceed as if actually painting on top of lacquer coating. This causes the coat to soften and the brush marks

are left imprinted on the picture. I think, with a little practice, one could make a picture look as if it had been painted with a brush. —William Wright.

Changing Walnut Finish to Antique Maple

Referring to G.W.N.'s question under the above heading on page 72 of November issue, and the two answers to same, I feel prompted to offer some additional suggestions on this, as I have had considerable experience in imitating maple on metal furniture.

Since G.W.N. has his cabinets covered with a clear flat lacquer, I suggest that he purchase a flat lacquer and "maple-ground" lacquer already mixed for spraying.

Sand the cabinets with No. 320 sandpaper, and then spray on a coat of this material. Allow the finish four hours to dry in a room where the temperature averages about 70° F. or more. Then sand the surfaces with No. 320 sandpaper.

Mix up a stain as follows:

Sienna .....(parts)	2
Raw umber	1
Burnt umber	1

For a liquid to carry this material, mix linseed oil and turpentine in the proportion of 1 (of linseed oil) to 2 (of turpentine), and add just a little japan dryer to hasten the drying. Then take a good size sponge and apply the stain evenly all over the cabinets. An old worn-out flat 3-in. brush makes a good mottler for maple. Saw off the handle close to the binding; then it is ready to use.

In mottling the cabinet, use the brush crosswise; and the mottling is supposed to be very close together. After the mottling is properly done, blend the surface all over with a badger blender. For this I suggest a 3-in. blender.

Allow the work to dry 24 hours; then apply two coats of clear flat lacquer. I believe, this is a simple and economical way to produce antique maple.

Here is another method for imitating antique maple: Spray on a coat of "maple-ground" lacquer, and use amber stain—or brown enamel will do. Spray this material all over the cabinet; this will leave light and dark places, and also it will show specks throughout. For spraying this material use a shading gun. Allow the sprayed finish time to dry, and then spray on one or two coats of clear flat lacquer. This will give you an excellent finish.—George Moskos.

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Division of

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Antique Finished Paper Screens

We manufacture folding screens made of wallpaper, and are endeavoring to obtain what is known as an "antique finish" on this paper. Have you any suggestions as to how to produce this finish on wallpaper?—M. B. L.

There are two methods by which you might obtain an antique finish on folding screens made of wallpaper.

First: Oft times Russian mineral oil, or any light colored, light bodied oil is applied to the paper by brushing, allowed to dry over night and then given a coat of varnish. In the application of varnish over the oil, it is found that oil causes a separation and cracking of the varnish and gives that antiqued effect.

Second: Another method is the use of crackle lacquers, which can be done by using colored base coats and colored crackle lacquers or straight crackle lacquers on the paper, and then finishing with a clear lacquer. I believe that the clear lacquer application will more or less add gloss and take away the antiqued effect, but it also tends to protect the crackle lacquer finish.—G. B. W.

Odorless Refrigerator Finish

Referring to the inquiry from A. W., Auckland, N. Z., appearing in August issue, I agree with Mr. Napoleon F. Fine that A. W. is putting too much material on the galvanized iron linings of his refrigerators. I also agree that lacquer is not the best finishing material for this particular work, for several reasons.

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802 Wulsin Bldg., Indianapolis, Ind.

An enclosed article creates recoil of the air or spray when quick drying materials are used. The recoil carries or produces spray dust, which lodges on a partially dry surface and creates a rough surface. It requires extra labor in sanding and mist coating to make the surface look presentable again. The food-tainting power of such materials is another thing that most people engaged in refrigerator finishing are apt to overlook. While lacquer may be odorless after all the solvents are evaporated, most of them still retain the power to taint food long after the perceptible odor has disappeared.

The following is an inexpensive method of finishing these refrigerator interiors: Sand rapidly, giving a little more attention to the usual dark spots on the galvanized iron caused by soldering acids, etc.; then, with a pad of cheesecloth, apply a very thin glaze of clear oil primer. This clear oil primer will readily adhere to the galvanized iron surface without first treating the surface with acetic acid. Bake four hours at 180° F., or air dry overnight. After baking, sand lightly and spray on a coat of an oil-base, solid-covering, white enamel; follow with a double coat and bake again for four hours at 180° F.

The enamel I have in mind using with the above method of finishing refrigerator interiors is free of pine oil or turpentine odors, and it is cut thin with V. M. P. naphtha. When this enamel is dry, it is odorless and taint-proof. This is a satisfactory, quick, and inexpensive way to finish popular priced refrigerators.

Another method (perhaps a better one) rapid enough for production is to sand the galvanized iron interiors, giving special atten-

tion to the dark spots as mentioned before. Then wipe these interiors with a rag moistened with vinegar or acetic acid, being careful to cover the entire surface—not leaving any metal spots untouched by the acid. Dip in boiling water; this will check any sulphate action and also cause them to dry rapidly. Carefully wipe the white chalky powder off the surface, and spray with a special odorless, taint-proof long-oil pigmented primer. Bake four hours at 180° F., sand, and apply a double follow-up coat of the same type of enamel suggested in the first method. Bake again at 180° F. for four hours.

For best results, the air conditions should be favorable and the work should be performed by an experienced finisher. The finisher should be supplied with a good spray gun and a vapor-proof flood light reflected into the refrigerator interior over his shoulders. And lastly, if upon inspection one finds a few sags or "lace curtains," cut them down smooth by using No. 320 wetordry sandpaper with Castile soap and water. The approved method is to dampen sandpaper, rub on soap, and lightly cut the sags only. If carefully performed, this operation can be done without cutting through the surrounding surface.

It is well to guard against the possibility of soot or dirt blowing in on the surface during the finishing operations. This causes considerable trouble on any white work, especially on door panels and tanks. When a particle lights on the surface being sprayed, it starts rolling a head of the spray, forming a little ball and marring the surface to such an extent that the finisher naturally wishes to cut it off. However, if this is done, the

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shell surrounding the particle being cut through exposes the color or black; and if it is dragged out on the surface, it will cause a smear or smudge that is hard to obliterate. Therefore, for an economical, clean, attractive finish, it is necessary that air conditions be good—that the air entering the finishing room and spray booths be clean, and that air lines be free from oil and water.—M. V. Leach.

Unit Heater Blew Dust on Finished Surfaces

The overhead unit type of heater is, I believe, the most successful means of heating an industrial plant. However, care should be taken when placing this type of heater in the finishing room, or it may cause trouble. For example, recently, unit type heaters were installed in an automobile plant, and one of the heaters in the finishing room happened to be directed toward a conveyor line which carried black enameled fenders from the dip tanks to the baking oven.

The fan of this heater was attracting small particles of dust and blowing them onto the freshly dipped work. Fenders coming from the oven with the dust baked in the finish, of course, had to be returned to the refinishing department. It was not long before the cause of the trouble was discovered—and eliminated by turning the unit heater in another direction.—M. V. L.

Polished Silver Finish

A fine polished silver finish may be obtained by using a mixture of No. 600 aluminum powder and clear lacquer. To secure the best effect it is necessary to use this very fine grade of aluminum bronze, sometimes called "striping bronze." Because of the fineness of the material, the mixture should be agitated frequently. If this is not done the powder will settle in the bottom of the container and cause irregularity in the color of the finish.

It is best to mix only enough of this material for one day's run. This also should be agitated at frequent intervals; otherwise a jelly is formed which is insoluble in lacquer reducer.

If a higher luster is desired, the surface may be sprayed with clear lacquer after the silver finish has thoroughly dried.—W. E. Warner, Essex, England.

N. E. Dabolt Joins Spruance

The Gilbert Spruance Co., Richmond & Tioga Sts., Philadelphia, Pa., has secured the services of Mr. Newton E. Dabolt to take full charge of the personnel and conduct the Industrial Sales Department.

Ray C. Martin Now With General Paint Corp.

Mr. Ray C. Martin, formerly with The Glidden Co., (San Francisco branch) announces his new connection with The General Paint Corp., 908 S. Main St., Los Angeles, Calif. Mr. Martin was superintendent of the Glidden Co's. lacquer department at San Francisco.

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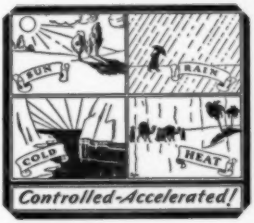

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Lacquer Finish Schedule for Metal Refrigerators

In the finishing of metal refrigerators in lacquer enamels, the lacquer industry has been presented with a problem akin in some respects to the finishing of motor cars. However, the intense cold is the one extreme climatic condition to which most consideration has to be given.

In production, metal refrigerators require a rapid-drying coating material which afterwards must contract and expand under various atmospheric conditions in storage, in transit, on the sales floors, and finally to the colder temperature when placed in service. Another feature of vital importance is the fact that the lacquer must not permeate any foodstuffs which may come into contact with it.

There are various metals employed in the manufacture of metallic refrigerators, but I understand that a metal coated with zinc, thereby amalgamating with the base metal, has given satisfactory results over a long period of time. Such a metal should require no preliminary acid or chemical treatment.

Today, lacquer enamels are used to finish the greater portion of metal refrigerators throughout the country; a satisfactory lacquer finishing schedule follows:

1—CLEANING: A lacquer cleaner is used to clean all metallic surfaces to insure freedom from grease and all foreign matter.

2—PUTTY: A white lacquer putty or glaze is employed to fill up all file marks and imperfections in the metal surface. This is applied by "knifing," and is allowed to air dry a satisfactory length of time, after which the surface is sanded smooth.

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3—UNDERCOAT: A white lacquer undercoat, reduced to satisfactory spraying consistency is applied over the entire metal surface inside and out, and allowed to air dry 20 minutes before the next operation.

4—UNDERCOAT: Same as third operation.

5—ENAMEL: White lacquer enamel, reduced in the same manner as the undercoat, is applied over the undercoat and allowed to air dry about 30 minutes.

6—ENAMEL: Same as fifth operation.

INTERIOR: An odorless white lacquer enamel is applied to the inner section of the refrigerator. This product is put on in the same manner as the enamel mentioned above.

The coated refrigerator is allowed to stand over night; then it is packed ready for shipment.—M. C. Roberts.

DuPont's Marine Lacquer

According to the company's literature, "marine lacquer, manufactured by the Industrial Finishes Division of E. I. DuPont de Nemours & Co., for the outboard motorboat field, does not blister, peel or check, when subjected to severe exposure to weather and water." This product is also said to be quick drying.

Hercules Appoints New Naval Stores Distributor

The Hercules Powder Co., Wilmington, Dela., announces the appointment of Loos & Dilworth, Inc., Swanson & Kenilworth Sts., Philadelphia, Pa., as its new Naval Stores Distributor. Loos & Dilworth will represent Hercules in eastern Pennsylvania and southern New Jersey after January 3, 1931. Associated with the new Hercules distributors will be Mr. Jeffrey Stewart, formerly of the firm of Stewart & Patterson, who in the past have been able distributors of Hercules Naval Stores.

Industrial Finishing
MAGAZINE

Issued fifteenth of each month. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

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EDITORIAL

Union Painters Endorse Spray Painting

The report of the Paint Spraying Fact Finding Commission of the Brotherhood of Painters, Decorators and Paperhangers of America made public, is based on an extensive investigation by a commission appointed by the general executive board. Among other things, it discusses the influence of the spray machine on the economic side of the painting industry and concludes with a summary of its findings in which the most striking, in view of past antagonism on the part of the union painters, is the statement that "with proper organization the adoption of the spraying machine as a tool of the trade will materially benefit our members."

In summing up, the Commission wishes to state that the following are the high spots brought out by the investigation:

(1) The spray painting machine is indispensable for industrial production.

(2) The spray painting machine has proved its value in many branches of house and structural painting.

(3) The hazards of poisoning by lead, benzol and silica, have been greatly reduced by substitution of non-toxic materials, by mechanical perfection of the spray gun, and by the use of proper precautionary safeguards.

(4) By practical education, teaching the proper operation and proper service of the spraying machine, hazards can be still more reduced.

(5) Adequate, uniform regulations by law are necessary for the protection of the spray operator.

(6) It is possible to adopt the spraying machine as a recognized tool of the trade provided that necessary protection is afforded the operator.

(7) With proper organization the adoption of the spraying machine as a tool of the trade will materially benefit our members.

(8) The adoption of the spray gun would not interfere with the prerogative of the individual members.

(9) The solution of the problem is not a local, but a national one.

What Finishing Costs

Nearly all of us realize that a knowledge of true costs and the prevention of excessive costs are vitally important to men responsible for results in any finishing department—whether it be in the small shop or the large plant.

Remarkable advancement has been made in improved finishing materials and labor-saving equipment for use in finishing departments. Every alert executive knows something about the majority of these improvements and, in most cases, has taken advantage of them.

There are only two prime elements of cost, namely, labor and material. Geographically speaking, the wage scale is fairly constant and uniform. Speaking from any standpoint, geographical or otherwise, the total cost of finish-

ing materials for different finish schedules varies considerably. Naturally with competition as keen as it is today, it is of utmost importance that an economical schedule be adopted. But what is an economical schedule?

There is only one way to answer this question correctly, and that is through experimentation based on specifications and true costs. Experiment not only with various finishing materials, but with methods of application—spraying, dipping, flow coating, rolling, tumbling, mechanical brushing, hand brushing, etc. One means of application is undoubtedly the most economical and the best means of applying finishing materials on certain products, while on certain other products the excess costs of another method may be rendered economical through the saving of expensive finishing materials, or for some other reason. To intelligently experiment is to learn that true costs may reveal some startling facts.

Effective Color Combinations

It is one thing to use color for arresting attention or producing attractive effects, but quite another to use color effectively for the purpose intended. In this connection it is interesting to review the results of an experiment conducted at New York University to test color preference for cake cartons. An account of this appeared in *Printers Ink Monthly*, under the title "Choosing the Right Color for the Package", by R. B. Franklin.

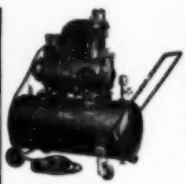
A group of men and women made the test and the order of merit method was used. The result of the test showed that yellow was the first choice for both men and women, white second, and orange third. Green, red, blue, purple and black followed in order.

In a similar test for color preference for fruit cans, yellow again won, with white second, orange third, and green fourth. In a coffee carton test, orange ranked first, yellow second and red third.

In choosing colors for cartons, it is always well to bear in mind legibility of color combinations so that the correct lettering color will be chosen for the particular background color that wins the test. An interesting table, determined by M. Luckiesh and recorded in his book "Language of Color," follows:

Results	Lettering	Background
1 (most	black	yellow
2 legible)	green	white
3	red	white
4	blue	white
5	white	blue
6	black	white
7	yellow	black
8	white	red
9	white	green
10	white	black
11	red	yellow
12	green	red
13 (least	red	green
14 legible)	blue	red

It is surprising tha although yellow so frequently comes at the top or near the top of color preference test rankings, it is not more widely used. One reason for this is that few manufacturers give the proper attention to the importance of consumer tests before choosing package color combinations. Such tests are comparatively inexpensive and if submitted to groups of sufficient size are accurate indicators of what colors consumers really prefer. For various illogical reasons, many manufacturers follow a policy of consulting their own preferences, or use colors because somebody tells them that those colors are best.



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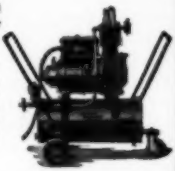

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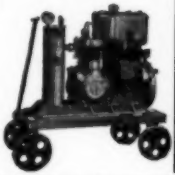

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